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Third Spectrum of Palladium (Pd III)

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The Pd III spectrum has been observed from 688 to 2991 A, and the earlier analysis has been revised and extended. The number of Pd III lines here reported is 1,110, of which 917 are classified as combinations of 57 even energy levels with 111 of odd parity. The interpretation has been aided by theoretical predictions of the approximate positions of expected energy levels. Spectral terms from the $4d^9$, $4d^8 ns^1$, and $4d^8\ 5s^1\ 5p^1$ configurations are designated. Eight limit terms are in the $4d^7\ ns^1$ configurations. The earlier ionization potential, 33.0 electron volts derived from the $(ns^1)\ ^{3,1}F$ series ($n=5,6$) by means of a Ritz formula, remains unchanged.

1. Introduction

Although a table of energy levels of the third spectrum of palladium was published in Atomic Energy Levels Vol. III[1] [1] in 1958, no description of the spectrum itself has appeared in print. Since the original analysis was done, I have made new measurements of the spectrum lines and have corrected and added to the analysis. While I was engaged in that work, the thesis of Dr. Yehudi Shadmi appeared in June 1961, with the title "A Systematic Treatment of the Low Configurations in the Spectra of the Transition Elements." His research extended the theoretical work started by Professor Racah [2] so that he was able to make a calculation of the even levels of the third spectra of the iron period and the first, second, and third spectra of the second long period. Palladium III was an important spectrum in that last group, being the last spectrum in the period of any considerable complication. Shadmi, who was in Princeton at the Institute for Advanced Study in 1961–62, also was good enough to ask one of his colleagues, Zvi Shimoni, in Jerusalem to calculate for me the positions of the odd levels of Pd III. As a result I have been able to correct the analysis in a number of points. They are discussed below.

2. Observations

The method of excitation of the spectrum was the same as that used for Ni III [3] with a number of refinements. The spark was operated in helium by using a transformer-condenser circuit with an auxiliary spark gap. The gap was a mercury gap, formerly part of an old induction furnace, and its present use gave considerably sharper spectra than the air gap used in recent years. Figure 1 shows the design of this useful and quiet gap. The accuracy of the level scheme was considerably improved by new measurements of all the longer wavelength lines by means of our 21 ft 30,000 line per inch grating in a Paschen mounting. The lines of the third spectrum were first spotted by observing their polarity in spectra taken with a stigmatic mounting at smaller dispersion. This was necessary, of course, because of the great astigmatism of the Paschen instrument. The accurate measures were extended to the λ 1944 line of Cu II and were based on the copper lines as standards [4]. This wavelength range overlaps the strong oxygen absorption bands with the consequence that some strong Pd III lines are missing on the high dispersion photographs, and others are much weakened. This probably means that all the measurements below about 2000 A may be inaccurate due to absorption on one side or the other of the lines. In the part of the spectrum measured with the vacuum instrument only, the accuracy is somewhat better than in previous papers from this laboratory because of recent improvements in standards [5]. In table 1 from 1946 to 2197 A two sets of intensity estimates are listed: LG denotes the large grating and VG denotes the vacuum grating.

3. Analysis

The electronic structures which are responsible for Pd III are analogous, of course, to those of Ni III, but the change in the n's of the electrons produces very large differences in the level structure. The total spreads of energy in $4d^8$ and $4d^7\ 5s$ are only about 0.78 of those in $3d^8$ and $3d^7\ 4s$ but the spread of most of the individual terms is larger by a factor of over two. In consequence, there is a much greater mixing of terms and a great decrease in the individuality of the levels so that it becomes chiefly a matter of taste or convenience to use Russell-Saunders notation for many of the even levels and for a majority of the odd levels. The names chosen are mainly based on relative intensities of combinations, but some are based on analogy with other spectra. This leads to a considerable number of differences between my choice and those of

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[1] Figures in brackets indicate the literature references at the end of this paper.

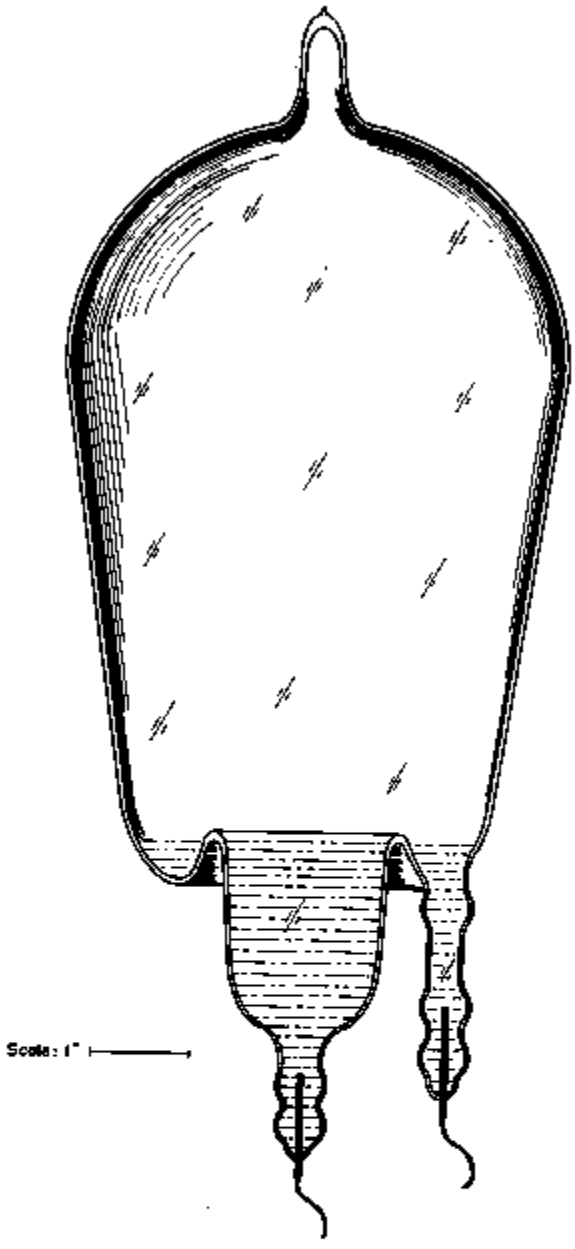

FIGURE 1. *Mercury spark gap.*

Shadmi and Shimoni although the numerical agreements between theory and observation are extraordinarily good.

4. Configurations $4d^6$ and $4d^7$ 5s

Shadmi's allocations differ from mine in one case only, the interchange of $a\,^1D_2$ and $a\,^3P_2$. The evidence for this change from intensities is ambiguous and I have preferred to retain my original choice.

There are, however, cases in which the theory does not predict significant mixing of identities, but where the experimental evidence does. The most important example is the mixing of $b\,^3F_3$ and $a\,^5P_3$ which are only 453 cm^{-1} apart. That they share their combining properties to a very considerable extent is shown by the following selected pairs of intensities. With $z\,^5S_2^\circ$ the intensities are 200 and 300; with $z\,^3F_2^\circ$ 200 and 200; with $z\,^3G_4^\circ$ 500 and 250; with $z\,^3D_3^\circ$ 200 and 200; with $z\,^3P_3^\circ$ 150 and 200.

Two corrections amongst the even levels should be noted. $c\,^3P_0$ was incorrectly copied in my original manuscript and is now corrected. I have found, also, a new level $b\,^3D_1$ which fits both theory and observation better than the one which was previously reported and is now deleted. The only missing level of $4d^7\,5s$ is $(b\,^2D)^1D_2$. A thorough search has been made for it with no result in spite of the guidance of Shadmi's prediction.

As usual, the $^1S_0$ of the d^8 structure is missing. Its predicted position is so high that most of its combinations would lie in regions of the spectrum where very few lines have been observed. However, the theoretically predicted positions of $a\,^1S_0$ and $(b\,^2D)^1P_1^\circ$ differ by 118140 and there is a strong isolated and unidentified line at 117804 cm^{-1}. Since the sole parent of $d^8\,^1S_0$ in d^7 is $b\,^2D$ this combination should be the strongest of all those possible. The only other lines which fall near predicted positions are the questionable ones at 82861 and 82800 cm^{-1}. If one of these is taken as $c\,^3P_1-(b\,^2D)^1P_1^\circ$ then $a\,^1S_0$ falls at 41112 or 41051 both of which are close to the predicted position 41196.

5. Configuration $4d^7\,5p$

Although Shimoni's calculated odd levels agree numerically very well indeed with the empirical levels, there are many differences of interpretation. He gave in his communication to me the percentage composition of all the levels; and if one were to name each level to agree with its major component, there would be at least 15 more differences in interpretation than the 14 chosen by Shimoni.

Oddly enough, in the case of the important quintets built on the ^4F of Pd IV Shimoni has chosen identifications which agree with mine, even though the percentage composition could in some levels lead to changes, and even though, also, this is the only set of levels for which I have used names based on an analogy in disagreement with the evidence of the intensities. In the isoelectronic sequences which begin with Fe I and Ru I, the identification of these levels in the arc spectra is the same whether based on intensities or g-values. It is quite otherwise in Co II [6] where the pattern of levels differs markedly from Fe I and where the evidence of the g-values is in considerable disagreement with the intensities. Since in Ni III, Rh II [1] and Pd III the pattern is more like Co II than Fe I, I have chosen the levels of Pd III by analogy with Co II and therefore in disagreement with the intensities. Figure 2 shows the two choices. In the triplet triad built on ^4F of Pd IV, Shimoni has again chosen in agreement with me al-

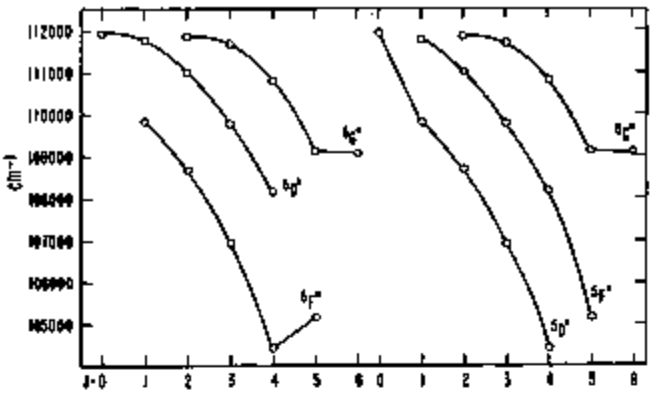

FIGURE 2. $4d^7\,5p$ $^5D^\circ$, F°, G°, *as identified by analogy with* Co II *(on left) and by intensities (on right).*

though the percentage composition of $z\,^3F_3^\circ$ and $z\,^2D_3^\circ$ is slightly in favor of an interchange. The intensities are somewhat ambiguous.

In the region of energies from 119000 to 129000 there are 45 odd levels, of which ten are named differently by Shimoni and myself. Figure 3 is a plot to show the two arrangements. The intensities are in favor of my identifications but there are certainly fundamental questions to be answered. For instance, the composition given for my $z\,^5P_3^\circ$ is 49 percent $(^4P)^5D^\circ$, 17 percent $(^4P)^3D^\circ$, 14 percent $(^4F)^5D^\circ$, so that $^5P^\circ$ should be a very minor constituent in disagreement with the intensity observations. My $z\,^5P_2^\circ$ also has no major $^5P^\circ$ character in its makeup. These few examples indicate a very wide divergence in this respect between experiment and theory and a detailed examination would appear to be of importance. The levels at 119187 and 125477 which Shimoni calls respectively $(^2P)^3P_1^\circ$ and $(^4P)^3S_1^\circ$ could be interchanged and the lower one labeled $(^2P)^3S_1^\circ$ from intensities. The choice I made for 119187 $^5P_1^\circ$ however fits the intensities best.

In this part of the analysis, Shimoni's predictions of the positions of $(^2P)^3P_0^\circ$ and $(^4P)^3P_0^\circ$ made it possible for me to find these two levels, which are always elusive because of the paucity of combinations of levels of $J=0$. Amongst the higher terms there are a few more differences of naming, but more important is the fact that Shimoni's predictions led me to discover that my $w\,^2F_2^\circ$ is in reality $w\,^2G_3^\circ$; that my $x\,^1F_2^\circ$ is $w\,^3F_2^\circ$ and that my old $w\,^3G_3^\circ$ is spurious. This cleared up the difficulty, that I had one too many levels with $J=3$. The only odd set of terms that is incomplete is the one based on the higher of the ^2D terms of $4d^7$. $w\,^2P^\circ$ seems excellent but the fragments of $^3F^\circ$ and $^3D^\circ$ are all quite uncertain. They were chosen to fit the Shimoni analysis but the fact that levels such as $^3F_4^\circ$, which should give stronger lines, are missing makes them all doubtful. The level given in A. E. L. as $w\,^3D_2^\circ$ is certainly spurious.

It is of considerable importance to find an accurate ionization potential by means of series and I, therefore, made a great effort to identify the levels of $4d^7(^4F)6s$ and $4d^7(^4F)5d$ which should lie at about 170,000 to 175,000, making combinations with the $5p$ levels in the range 1450 to 1700 A. Long exposures were made in this region and every possible

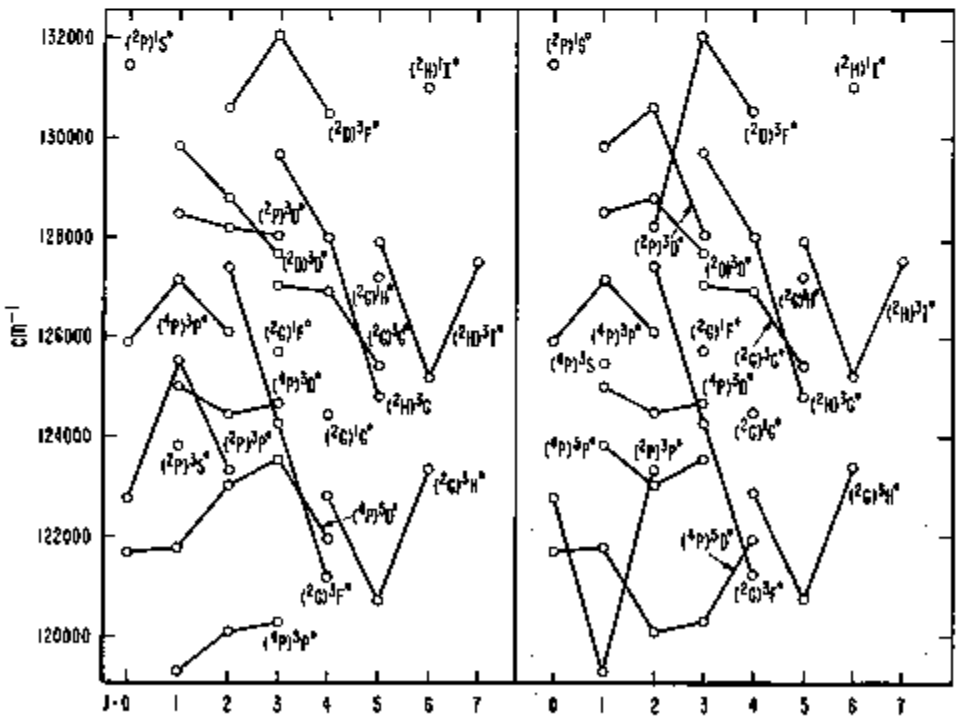

FIGURE 3. *Some levels of $4d^7\,5p$ as identified in this paper (on left) and as identified by Shimoni (on right).*

line measured. The results were very disappointing, only 12 levels being retained as probably real. This is all the more surprising in that many complete terms were found in the corresponding structures of Co III. Of the levels here listed 1_4 is probably $6s\ ^5F_5$ as given in A. E. L.; 2_4 is perhaps $6s\ ^5F_4$ and 11_4 is about correct for $6s\ ^3F_4$. The remainder cannot be identified except that it is certain that all but 11 and 12 are quintets. I cannot, therefore, give any evidence that will improve our knowledge of the ionization potential.

6. Configurations $4d^8\,5s^2$ and $4d^6\,5s\,5p$

There remains the problem of the terms $4d^6\,5s^2\ ^5D$ and the various odd triads from $4d^6(^5D)5s\,5p$. The position of the even ^5D can be estimated from a consideration of various other spectra [7] as being between 128000 and 133000. Recently Shadmi has calculated the position for me as 131,500±1,000 cm^{-1}. The structure $4d^6\,5s\,5p$ yields two sets of quintets based respectively on ^5D and ^4D of $4d^6\,5s$. By analogy with Ru I, where both sets are identified, one can estimate that they should be separated by about 10,000 cm^{-1}. Also the lower triad gives lines in combination with the even ^5D of nearly the same wave number as $4d^7\,5s$–$4d^7\,5p$ which lie at about 54,000 cm^{-1}. This would place the lower $4d^6\,5s\,5p$ quintet triad around 185,500 ±1,000 and no levels at all have been found in that region. The higher quintets should lie about 10,000 higher and they may be represented by the levels 1 to 7°. This is an unsatisfactory conclusion because in both Fe I and Ru I the lower triad gives considerably stronger lines than the upper one.

The line list includes all the lines that can be assigned to Pd III with some certainty. Only in the region from 1500 to 1650 A where I took excessively long exposures have I eliminated a a considerable number of the measured lines which appear to be more probably due to Pd IV. Especially in this region some new source which develops the Pd III spectrum more completely and eliminates most of the lines of Pd IV is necessary if the higher structures are to be identified with any certainty.

There are a few unidentified lines in the region 680 to 800 A which are probably due to the structure $4d^6\,5s\,5p$. In the region 1450 to 1700 A the many unidentified lines are undoubtedly due to structures $4d^7\,6s$ and $4d^7\,5d$ as discussed above or to Pd IV. In the part longer than 1950 A there are five unidentified lines of considerable strength. The only structures to which they can be attributed are $4d^7(b\ ^2D)5s$ and $5p$, but no logical way of fitting them into the term scheme has been found.

The accuracy with which Shadmi's and Shimoni's predictions fit the numerical data makes it obvious that when a theoretical analysis of that kind is available, the experimentalist would be unwise to ignore it. Very definite empirical evidence would be necessary to justify any large difference between theory and experiment.

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TABLE 1. *List of lines of* Pd III

Wavelength λ (Vac)	Intensity	Wave number	Identification
688.743	10	145192.0	$a\ ^5F_5$—7°_4
689.456	20	145041.9	$a\ ^5F_4$—6°_4
689.542	50	145023.8	$a\ ^5F_5$—$5^\circ_{5,4}$
691.575	10	144597.5	
692.626	5	144378.1	$a\ ^5F_4$—4°_4
692.830	20	144335.6	$a\ ^1D_2$—$w\ ^3P^\circ_1$
693.426	2	144211.5	$a\ ^1D_2$—$v\ ^3F^\circ_2$
694.961	10	143893.0	
695.319	15	143818.9	
695.907	50	143697.4	$a\ ^1D_2$—$w\ ^3P^\circ_2$
696.937	2	143484.6	
697.054	2	143460.9	
700.043	20	142848.4	$a\ ^5F_4$—$5^\circ_{3,4}$
700.122	15	142832.5	
704.335	5	141977.9	$a\ ^3F_4$—$w\ ^3F^\circ_4$
704.626	50	141919.2	$a\ ^3P_1$—$w\ ^5P^\circ_3$
704.850	3	141874.2	$a\ ^3F_4$—$w\ ^3G^\circ_3$
705.490	200	141745.5	Pd IV?
707.797	150	141283.4	$a\ ^3F_4$—$v\ ^5D^\circ_3$
708.125	15	141218.0	$a\ ^5F_3$—6°_4

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
708.731	10	141097.2	$a\ ^3P_1 - w\ ^3P_1^\circ$
709.885	100	140867.8	$a\ ^3P_1 - w\ ^3P_1^\circ$
711.954	100	140458.5	$a\ ^3P_1 - w\ ^3P_2^\circ$
712.730	10	140305.6	$a\ ^5F_0 - 1_1^\circ$
712.958	50	140260.9	
713.928	15	140072.1	$a\ ^5F_4 - 2_{3,4}^\circ$
714.625	30	139933.5	$a\ ^3P_2 - w\ ^3P_1^\circ$
715.041	1	139852.1	
715.237	1	139813.1	
715.997	0	139665.3	
716.121	0	139641.2	
717.904	100	139294.3	$a\ ^3P_2 - w\ ^3P_2^\circ$
718.124	10	139251.7	
719.474	100	138990.4	$a\ ^3F_2 - v\ ^3D_2^\circ$
720.213	5	138847.8	
720.964	10	138703.2	$a\ ^5F_3 - 3_2^\circ$
720.997	20	138696.8	
721.568	3	138587.0	
722.447	15	138419.2	$a\ ^5F_3 - 2_{3,4}^\circ$
723.935	50	138132.4	$a\ ^5F_4 - 1_4^\circ$ and $a\ ^1G_4 - v\ ^3F_4^\circ$
724.348	15	138053.8	$a\ ^3F_3 - v\ ^3D_3^\circ$
725.646	15	137808.2	
725.732	10	137791.9	$a\ ^5F_3 - x\ ^1G_4^\circ$
725.934	1	137753.5	
726.766	5	137595.8	$a\ ^5F_2 - 3_2^\circ$
727.100	50	137532.6	$a\ ^3F_2 - v\ ^3D_3^\circ$
727.720	200	137415.4	$a\ ^3F_2 - v\ ^3D_1^\circ$
728.149	20	137334.5	$a\ ^3F_3 - x\ ^1D_2^\circ$
728.616	3	137246.5	$a\ ^3F_2 - w\ ^3F_3^\circ$
730.371	5	136916.7	$a\ ^5F_1 - 3_2^\circ$
730.733	3	136848.9	$a\ ^3F_4 - y\ ^1H_5^\circ$
731.830	5	136643.8	
732.073	3	136598.3	$a\ ^3F_2 - v\ ^3D_3^\circ$
732.704	3	136480.8	$a\ ^5F_4 - 1_3^\circ$
734.961	15	136061.6	
736.260	30	135821.6	$a\ ^3F_3 - w\ ^3G_4^\circ$
736.452	10	135786.2	$a\ ^3F_2 - w\ ^3F_3^\circ$
736.696	10	135741.2	
737.359	5	135619.1	
737.822	3	135534.0	
738.793	150	135355.9	$a\ ^3F_4 - y\ ^1F_3^\circ$
743.776	15	134449.0	
747.693	20	133744.7	
747.779	50	133729.3	$a\ ^3F_2 - w\ ^3G_3^\circ$
748.577	10	133586.8	
753.002	3	132801.7	$a\ ^3F_2 - x\ ^3P_1^\circ$
754.862	15	132474.5	$a\ ^3F_2 - w\ ^3F_3^\circ$
755.300	2	132397.7	$a\ ^5P_3 - 7_4^\circ$
755.426	3	132375.6	
755.859	15	132299.8	$a\ ^3F_4 - y\ ^3H_5^\circ$
756.137	50	132251.1	$a\ ^5P_4 - 6_4^\circ$
756.853	100	132126.0	$a\ ^3F_3 - y\ ^1F_3^\circ$
757.412	100	132028.5	$a\ ^3P_2 - x\ ^1F_3^\circ$
757.631	5	131990.3	$a\ ^3F_3 - x\ ^3P_2^\circ$ and $a\ ^1D_2 - v\ ^3D_3^\circ$
758.308	50	131872.6	$a\ ^1D_2 - v\ ^3D_1^\circ$
758.839	10	131780.2	
759.629	2	131643.2	
759.945	5	131588.5	$a\ ^5P_3 - 4_3^\circ$
763.058	500	131051.6	$a\ ^1D_2 - v\ ^3D_3^\circ$
764.192	3	130857.2	

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
764.447	5	130813.5	
766.102	5?	130530.9	$a\ ^3F_2—x\ ^3P_2$
766.424	500	130476.0	$a\ ^3F_4—x\ ^3F_4^\dagger$
767.265	50	130333.0	$a\ ^1D_2—x\ ^1D_2^\ddagger$
767.773	2	130246.8	$a\ ^1D_2—w\ ^3F_3^\dagger$
767.930	3	130220.2	$a\ ^3F_4—y\ ^3H_4^\dagger$
768.762	5	130079.3	
770.873	10	129723.0	$a\ ^3F_3—y\ ^1D_2^\ddagger$
771.105	10	129684.0	$a\ ^3F_4—y\ ^3G_3^\ddagger$
771.497	10	129618.1	
772.110	200	129515.2	$a\ ^3F_4—z\ ^1D_2^\ddagger$
774.416	3	129129.5	
776.315	100	128813.6	$a\ ^3F_3—x\ ^3F_3^\dagger$
776.507	200	128781.8	$a\ ^1G_4—x\ ^1F_3^\ddagger$
776.681	150	128753.0	$a\ ^3P_1—v\ ^3D_2^\ddagger$
778.783	50	128405.5	$a\ ^3P_0—v\ ^3D_1^\dagger$
779.483	15	128290.2	$a\ ^3P_1—3_2^\dagger$?
779.636	50	128265.0	$a\ ^3F_2—y\ ^1D_2^\ddagger$
780.115	100	128186.2	$a\ ^1D_2—w\ ^3G_3^\ddagger$
781.019	2000	128037.8	$a\ ^3F_4—w\ ^3D_3^\ddagger$
783.344	100	127657.8	$a\ ^3F_4—x\ ^3D_3^\dagger$
783.783	150	127586.7	$a\ ^3P_2—v\ ^3D_3^\ddagger$
784.361	20	127492.3	$a\ ^3F_2—y\ ^3S_1^\dagger$
784.985	200	127391.0	$a\ ^3F_4—x\ ^3F_4^\dagger$
785.184	20	127358.7	$a\ ^3F_2—x\ ^3F_1^\dagger$
785.883	150	127245.4	$a\ ^3F_4—x\ ^3F_3^\dagger$
786.244	3	127187.0	$a\ ^3F_4—z\ ^1H_5^\ddagger$
786.828	50	127092.6	$a\ ^3P_1—x\ ^1D_2^\ddagger$
787.314	200	127014.1	$a\ ^3F_4—x\ ^3G_3^\dagger$
787.837	100	126929.8	$a\ ^1D_2—w\ ^3F_3^\dagger$
787.950	200	126911.6	$a\ ^3F_4—x\ ^3G_4^\dagger$
789.356	15	126685.5	
789.583	200	126649.1	$a\ ^3P_2—v\ ^3D_2^\ddagger$
790.192	150	126551.5	$a\ ^1D_2—y\ ^1P_1^\dagger$
790.800	10	126454.2	$a\ ^3F_3—y\ ^3G_3^\ddagger$
794.078	500	125932.2	$a\ ^3F_2—x\ ^3F_3^\dagger$
795.585	50	125692.7	$a\ ^3F_4—z\ ^1F_3^\ddagger$
796.384	150	125567.6	$a\ ^3F_3—x\ ^3D_3^\dagger$
797.517	500	125389.2	$a\ ^3F_4—x\ ^3G_5$
799.013	200	125154.4	$a\ ^3F_2—x\ ^3D_1^\dagger$
799.202	200	125124.8	$a\ ^1D_2—y\ ^1F_3^\ddagger$
800.025	500	124996.1	$a\ ^3F_2—y\ ^3G_4^\dagger$
800.103	500	124983.9	$a\ ^3F_3—w\ ^3D_2^\dagger$
801.223	50	124809.2	$a\ ^3F_3—w\ ^3D_3^\dagger$
801.570	200*d*	124755.2	$a\ ^3F_4—y\ ^3G_5^\ddagger$ and $a\ ^3F_3—y\ ^3G_4^\ddagger$
802.286	150	124643.8	$a\ ^3F_4—y\ ^3D_3^\dagger$
803.665	500	124429.9	$a\ ^3F_4—z\ ^1G_4^\ddagger$ and $a\ ^3F_3—x\ ^3D_3^\dagger$
804.688	30	124271.8	$a\ ^3P_1—x\ ^3P_2^\dagger$
804.900	5	124239.0	$a\ ^3F_4—y\ ^3F_3^\dagger$
805.725	40	124111.8	$a\ ^3F_2—x\ ^3D_2^\dagger$
806.317	50	124020.7	$a\ ^3P_1—x\ ^3P_1^\dagger$
807.672	50	123812.6	$a\ ^3F_2—w\ ^1D_1^\dagger$
807.827	150	123788.9	$a\ ^3F_3—x\ ^3G_3^\dagger$ and $a\ ^3P_0—x\ ^3P_1^\dagger$
808.497	30	123686.3	$a\ ^3F_3—x\ ^3G_4^\dagger$
809.536	100	123527.5	$a\ ^3F_2—w\ ^1D_2^\ddagger$
809.695	150	123503.3	$a\ ^3F_4—y\ ^3D_3^\dagger$
810.336	75	123405.6	$a\ ^1G_4—v\ ^1D_2^\ddagger$
810.928	10	123315.5	$a\ ^3P_1—y\ ^1P_1^\dagger$
812.086	50	123139.7	$a\ ^1G_4—x\ ^1G_4^\dagger$
812.443	30	123085.6	$a\ ^3P_0—y\ ^1P_1^\dagger$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
813.192	100	122972.2	$a\ ^3F_2—x\ ^3D_1$
813.989	150*d*	122851.8	$a\ ^4F_3—y\ ^3P_2$ and $a\ ^3P_2—x\ ^3P_1$?
814.524	100	122771.1	$a\ ^3F_4—z\ ^4H_5$
815.053	200	122691.4	$a\ ^3F_3—y\ ^4F_3$
816.221	200	122515.8	$a\ ^1D_2—z\ ^1D_2$
816.400	15	122489.0	$a\ ^1D_2—z\ ^1P_1$
816.563	200	122464.5	$a\ ^3F_3—z\ ^1F_3$
818.679	200	122148.0	$a\ ^3P_2—y\ ^1P_1$
820.012	100	121949.4	$a\ ^1D_2—y\ ^3S_1$
820.342	75	121900.4	$a\ ^3F_4—y\ ^5D_1$
820.917	20	121815.0	$a\ ^1D_2—x\ ^3F_3$
821.162	5	121778.7	
821.353	50	121750.3	$a\ ^3P_1—x\ ^3P_2$
823.643	300	121411.8	$a\ ^4F_4—y\ ^3D_3$?
825.076	150	121200.9	$a\ ^4F_4—z\ ^1G_4$
825.345	500	121161.5	$a\ ^3F_4—y\ ^4F_4$
826.411	400	121005.2	$a\ ^3F_3—y\ ^3F_3$ and $a\ ^3F_2—z\ ^1F_3$
828.359	30	120720.6	$a\ ^4P_2—y\ ^1F_3$
828.595	15	120686.2	$a\ ^5F_1—z\ ^5H_2$
829.316	300	120581.3	$a\ ^3P_2—x\ ^3P_2$?
830.639	30	120389.2	$a\ ^1D_2—x\ ^3F_3$
831.334	15	120288.6	$a\ ^4F_2—y\ ^3D_1$
833.627	15	119957.7	$a\ ^3F_2—y\ ^3D_1$
834.978	50	119763.6	$a\ ^4F_3—y\ ^1D_2$
836.041	30	119611.3	$a\ ^1D_2—x\ ^3D_1$
836.476	100	119549.2	$a\ ^3F_3—y\ ^3F_3$
836.948	100	119481.7	$a\ ^3P_1—y\ ^1D_2$
837.146	200	119453.5	$a\ ^1D_2—y\ ^3G_4$
838.414	30	119272.8	$a\ ^3P_1—x\ ^1D_2$
839.693	20	119091.1	$a\ ^4F_2—z\ ^3S_1$
840.214	100	119017.3	$a\ ^3P_0—z\ ^1P_1$
840.579	500	118965.6	$a\ ^1G_4—y\ ^1H_5$
842.376	50?	118711.8	$a\ ^3P_1—y\ ^3S_1$
842.675	2	118669.7	$a\ ^5F_3—y\ ^5D_1$
843.392	5	118568.8	$a\ ^1D_2—x\ ^3D_3$
845.268	50	118305.7	$a\ ^3F_2—y\ ^1D_2$
845.525	100	118269.7	$a\ ^1D_2—w\ ^3D_1$
846.687	30	118107.4	$a\ ^3P_2—z\ ^1D_2$
847.342	100	118016.1	$a\ ^3P_1—z\ ^1S_0$
847.582	30	117982.7	$a\ ^1D_2—w\ ^3D_2$
847.943	50	117932.4	$a\ ^4F_1—y\ ^3F_2$
848.868	100	117803.9	
850.733	20	117545.7	$a\ ^3P_2—y\ ^3S_1$
851.240	200	117475.7	$a\ ^1G_4—y\ ^1F_3$
851.589	100	117427.5	$a\ ^1D_2—x\ ^3D_3$
851.717	300	117409.9	$a\ ^4P_2—x\ ^3F_3$
853.610	50	117149.5	$a\ ^1D_2—y\ ^3F_4$
854.354	100	117047.5	$a\ ^1F_3—y\ ^1D_2$
854.766	30	116991.0	$a\ ^5F_1—z\ ^5P_2$
855.294	150	116918.8	$a\ ^1D_2—y\ ^3P_1$
856.071	50	116812.7	$a\ ^3F_3—z\ ^5P_3$
856.249	10	116788.5	$a\ ^1D_2—x\ ^3G_3$
856.470	500	116758.3	$a\ ^1G_4—y\ ^1G_4$
858.238	100	116517.7	$a\ ^3F_4—z\ ^3G_3$
859.309	10	116372.5	$a\ ^3P_1—x\ ^3D_1$
862.165	2	115987.1	$a\ ^3P_2—x\ ^3F_3$
863.200	200	115848.0	$a\ ^1D_2—y\ ^3P_2$
864.044	500	115734.8	$a\ ^3F_4—z\ ^3D_3$
865.285	200	115568.8	$a\ ^1G_4—y\ ^3H_5$
866.075	150	115463.4	$a\ ^1D_2—z\ ^1F_3$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
866.896	20	115354.0	$a\ ^3F_2-z\ ^3P^\circ_2$
867.087	100	115328.6	$a\ ^3P_1-x\ ^3D^\circ_2$
867.690	100	115247.3	$a\ ^1D_2-z\ ^3P^\circ_1$
867.992	75	115208.4	$a\ ^3P_2-x\ ^3D^\circ_1$
869.203	2	115047.9	$a\ ^3P_2-y\ ^3G^\circ_3$
869.330	10	115031.1	$a\ ^3P_1-w\ ^3D^\circ_1$
870.437	150	114884.8	$a\ ^3F_4-z\ ^3G^\circ_4$
871.061	100	114802.5	$a\ ^3P_0-w\ ^3D^\circ_1$
871.491	75	114745.8	$a\ ^1D_2-y\ ^3D^\circ_1$ and $a\ ^5P_1-w\ ^3D^\circ_2$
873.057	200	114540.0	$a\ ^5F_2-z\ ^5P^\circ_1$
873.977	200	114419.4	$a\ ^1G_4-y\ ^3H^\circ_3$
875.587	15	114209.0	$a\ ^1D_2-y\ ^3D^\circ_1$
875.931	100	114164.2	$a\ ^3P_2-x\ ^3D^\circ_3$ and $a\ ^1G_4-x\ ^3F^\circ_3$
877.897	10	113910.9	$a\ ^3P_1-y\ ^3F^\circ_2$
878.732	400	113800.3	$a\ ^3F_4-z\ ^3F^\circ_4$
880.590	500	113560.2	$a\ ^3F_3-z\ ^3D^\circ_3$
881.442	30	113450.4	$a\ ^3P_0-y\ ^3P^\circ_1$
882.690	50	113290.0	$a\ ^3F_3-z\ ^3G^\circ_3$
882.814	20	113274.1	$a\ ^1D_2-y\ ^3D^\circ_3$
884.304	50	113083.2	$a\ ^1D_2-z\ ^3P^\circ_2$
884.766	5	113024.2	$a\ ^3P_2-x\ ^3D^\circ_2$
885.913	300	112877.9	$a\ ^3F_2-z\ ^3D^\circ_1$
886.820	100	112762.4	$a\ ^1D_2-y\ ^3D^\circ_2$
888.842	500	112505.9	$a\ ^3F_4-z\ ^3G^\circ_3$ and $a\ ^3F_3-z\ ^3D^\circ_3$ and $a\ ^3F_3-z\ ^3F^\circ_3$
889.294	1000	112448.7	$a\ ^3F_4-z\ ^3F^\circ_4$
889.476	10	112425.7	$a\ ^3P_1-y\ ^3P^\circ_0$
889.801	5	112384.6	$a\ ^3P_2-x\ ^3G^\circ_3$
892.029	100	112103.9	$a\ ^3F_2-z\ ^3D^\circ_2$
892.793	150	112008.0	$a\ ^3P_1-z\ ^3P^\circ_1$
894.197	30	111832.1	$a\ ^3F_2-z\ ^3G^\circ_3$
894.428	1	111803.2	$a\ ^1G_4-y\ ^1G^\circ_4$
894.614	50	111780.0	$a\ ^3P_0-z\ ^3P^\circ_1$
895.599	100	111657.1	$a\ ^3F_3-z\ ^3G^\circ_4$
895.804	30	111631.5	$a\ ^3F_4-z\ ^3G^\circ_3$
896.813	200	111505.9	$a\ ^1D_2-y\ ^5D^\circ_1$ and $a\ ^3P_1-y\ ^3D^\circ_1$
897.300	3	111445.4	$a\ ^3P_2-y\ ^3P^\circ_2$
900.423	150	111058.9	$a\ ^3P_2-z\ ^3F^\circ_3$
900.490	300	111050.6	$a\ ^3F_2-z\ ^5F^\circ_3$ and $a\ ^3F_2-z\ ^5D^\circ_1$
901.130	50	110970.9	$a\ ^3P_1-y\ ^3D^\circ_2$
902.178	20	110842.8	$a\ ^3P_2-z\ ^3P^\circ_1$
902.904	400	110749.3	$a\ ^3F_4-z\ ^5G^\circ_4$
904.390	400	110571.8	$a\ ^3F_3-z\ ^3F^\circ_3$
906.531	30	110310.6	$a\ ^3P_1-z\ ^5S^\circ_2$
908.876	100	110026.0	$a\ ^1G_4-z\ ^3I^\circ_5$
909.003	50	110010.6	$a\ ^3P_2-y\ ^3D^\circ_3$
909.152	30	109992.6	$a\ ^1D_2-z\ ^3P^\circ_2$
910.373	50	109845.0	$a\ ^3P_1-z\ ^3P^\circ_2$
910.921	10	109779.0	$a\ ^1G_4-x\ ^3D^\circ_1$
911.367	15	109725.3	$a\ ^3F_4-z\ ^5D^\circ_3$
912.376	10	109603.9	$a\ ^3P_2-y\ ^3F^\circ_3$
914.858	100	109306.5	$a\ ^1G_4-z\ ^1H^\circ_5$
915.134	20	109273.6	$a\ ^3P_1-z\ ^3P^\circ_0$
915.582	200	109220.1	$a\ ^5F_5-z\ ^5F^\circ_4$
916.467	100	109114.6	$a\ ^3F_2-x\ ^3F^\circ_3$
916.783	200	109077.1	$a\ ^5F_4-z\ ^5G^\circ_3$
917.136	10	109035.0	$a\ ^1G_4-x\ ^3G^\circ_3$
917.450	100	108997.8	$a\ ^1D_2-z\ ^5P^\circ_1$
918.524	5	108870.3	$a\ ^3P_2-y\ ^3D^\circ_2$
920.136	3	108679.5	$a\ ^3P_2-z\ ^3P^\circ_2$
921.026	30	108574.5	$a\ ^3F_3-z\ ^5G^\circ_3$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (VAC)	Intensity	Wave number	Identification
922.498	200	108401.3	$a\ ^3F_3 - z\ ^5G^\circ_3$
922.855	5	108359.4	$a\ ^3P_2 - y\ ^5D^\circ_3$
925.617	10	108036.0	$a\ ^3P_0 - y\ ^5D^\circ_1$
927.526	100	107813.7	$a\ ^1G_3 - z\ ^1F^\circ_3$
930.151	100	107509.4	$a\ ^1G_4 - z\ ^3G^\circ_4$
931.641	20	107337.4	$a\ ^1D_2 - z\ ^3D^\circ_1$
933.573	5	107115.3	$a\ ^3F_2 - z\ ^5G^\circ_4$
933.700	10	107100.8	$a\ ^3P_2 - y\ ^5D^\circ_1$
935.623	10	106880.6	$a\ ^1G_4 - y\ ^3G^\circ_3$
938.311	50	106574.5	$a\ ^3P_1 - z\ ^5P^\circ_2$
938.435	50	106560.4	$a\ ^1D_2 - z\ ^3D^\circ_2$
939.014	5	106494.7	$a\ ^3F_3 - z\ ^5D^\circ_3$
940.825	5	106289.7	$a\ ^1D_2 - z\ ^3G^\circ_3$
941.145	1	106253.6	$a\ ^3F_2 - z\ ^5D^\circ_3$
947.606	30	105529.0	$a\ ^3P_0 - z\ ^3P^\circ_1$
947.780	300	105507.0	$a\ ^1D_2 - z\ ^3D^\circ_3$ and $a\ ^1D_2 - z\ ^3F^\circ_2$
948.652	5	105412.7	$a\ ^3F_4 - z\ ^3F^\circ_3$
956.077	50	104594.0	$a\ ^3P_2 - z\ ^5P^\circ_1$
957.681	75	104418.9	$a\ ^3F_4 - z\ ^3F^\circ_4$
960.643	100	104096.9	$a\ ^3P_1 - z\ ^3D^\circ_1$
962.753	100	103868.8	$a\ ^3P_0 - z\ ^3D^\circ_1$
965.516	300	103571.6	$a\ ^1D_2 - z\ ^3F^\circ_3$
967.865	200	103320.2	$a\ ^3P_1 - z\ ^3D^\circ_2$
968.223	3	103281.9	$a\ ^1G_4 - y\ ^3F^\circ_4$
972.689	100	102807.8	$a\ ^1G_4 - z\ ^3H^\circ_5$
977.805	100	102269.9	$a\ ^3P_1 - z\ ^3F^\circ_2$
981.503	10	101884.6	$a\ ^3P_2 - z\ ^3G^\circ_3$
989.103	20	101101.7	$a\ ^3P_2 - z\ ^3F^\circ_3$ and $a\ ^3P_2 - z\ ^3D^\circ_3$
996.768	10	100324.2	
1005.080	5	99494.6	$a\ ^1D_2 - z\ ^3D^\circ_3$
1008.385	30	99168.5	$a\ ^3P_2 - z\ ^3F_3$
1016.947	3	98333.5	$a\ ^3P_1 - z\ ^5G^\circ_2$
1057.415	5	94570.2	$a\ ^1G_4 - z\ ^3F^\circ_4$
1078.978	5	92680.3	
1088.450	0	91873.8	
1094.603	2	91357.3	
1096.531	3	91196.7	$a\ ^1G_4 - z\ ^5G^\circ_5$
1097.779	3	91093.0	
1144.970	5	87338.5?	
1145.316	10	87312.1?	
1206.840	15	82861.0?	
1207.729	5	82800.0?	
1400.767	3	71380.5	
1406.351	2	71106.0	
1407.798	1	71033.1	$a\ ^3G_5 - x\ ^1G^\circ_4$
1424.896	3	70180.6	$c\ ^3F_3 - v\ ^1F^\circ_3$
1433.903	15	69739.8	$b\ ^3F_4 - y\ ^3H^\circ_5$
1437.464	20	69567.0	$a\ ^5P_2 - y\ ^1F^\circ_3$
1440.393	2	69425.5	$a\ ^5G_4 - w\ ^3F^\circ_3$
1443.488	2	69276.6	$b\ ^3F_3 - y\ ^1F^\circ_3$
1447.175	2	69100.1	$b\ ^3P_1 - v\ ^3D^\circ_1$
1448.898	3	69018.0	$c\ ^3F_2 - v\ ^1F^\circ_3$
1449.615	50	68983.8	$a\ ^5F_5 - y\ ^5D^\circ_5$
1461.673	5	68414.8	$a\ ^5F_4 - y\ ^5D^\circ_3$
1465.296	10	68245.6	$a\ ^5F_3 - y\ ^3F^\circ_4$
1468.830	0	68081.4	$a\ ^3H_4 - x\ ^1F_3$
1477.144	10h	67698.2	$a\ ^5F_5 - y\ ^3D^\circ_3$
1481.768	2	67486.9	$b\ ^3F_3 - z\ ^1D^\circ_2$
1483.042	2h	67429.0	
1484.379	15	67368.2	$a\ ^3G_4 - w\ ^3G^\circ_3$ and $z\ ^5F^\circ_5 - 0_5$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1488.092	50	67200.1	$a\ ^3H_4-w\ ^3G^\circ_3$
1488.662	1	67174.4	
1494.462	10	66913.7	$z\ ^5F^\circ_4-5_{5,4}$
1496.704	10	66813.5	
1496.764	30	66810.8	$a\ ^5F_4-y\ ^5D^\circ_4$
1497.868	10	66761.6	$a\ ^3F_4-y\ ^5D^\circ_3$
1499.314	20	66697.2	
1501.606	1	66595.4	$a\ ^3F_2-y\ ^5D^\circ_3$
1502.036	3	66576.3	$b\ ^1G_4-w\ ^3F^\circ_4$
1502.154	10	66571.1	$a\ ^3F_3-z\ ^3P^\circ_2$
1502.378	2	66561.1	
1502.577	10	66552.3	
1502.842	10	66540.6	
1504.402	1	66471.6	$b\ ^1G_4-w\ ^3G^\circ_5$
1505.400	100	66427.5	
1505.658	3	66416.1	
1505.854	5	66407.5	$z\ ^5F^\circ_5-6_4$
1505.987	3	66401.6	
1509.399	3	66251.5	$a\ ^3F_2-y\ ^5D^\circ_2$
1510.323	10	66211.0	
1510.872	5	66186.9	$z\ ^5F^\circ_5-5_{5,4}$
1512.401	15	66120.0	
1513.475	5	66073.1	$a\ ^5F_4-y\ ^3F^\circ_4$
1514.137	15h	66044.2	
1515.934	40	65965.9	$z\ ^3F^\circ_4-3_5$
1517.183	200	65911.6	$z\ ^5F^\circ_4-2_4$
1517.614	15	65892.9	
1518.097	1	65871.9	$b\ ^3F_2-y\ ^1D^\circ_2$
1518.732	20	65844.4	
1518.924	20	65836.1	
1519.104	10	65828.3	$c\ ^3P_2-v\ ^3D^\circ_3$
1519.320	5	65818.9	
1519.635	3	65805.3	
1520.946	5	65748.6	$a\ ^3D_3-w\ ^5F^\circ_4$
1522.134	10	65697.2	
1522.641	5	65675.4	
1522.841	50h	65666.7	
1523.558	2	65635.8	$b\ ^3F_2-z\ ^1P^\circ_1$?
1523.688	3	65630.2	$a\ ^1G_3-w\ ^3G^\circ_3$
1524.038	10	65615.2	$b\ ^1G_4-x\ ^1G^\circ_4$
1524.634	30	65589.5	
1524.842	10	65580.6	
1525.183	5	65565.9	$a\ ^5P_1-z\ ^1P^\circ_1$
1526.249	50h	65520.1	$z\ ^5D^\circ_4-11_4$
1526.397	5	65513.8	
1526.515	10	65508.7	
1526.876	200h	65493.2	$z\ ^5F^\circ_5-4_5$
1527.247	20	65477.3	$b\ ^3F_4-w\ ^3D^\circ_3$
1527.462	5	65468.1	$a\ ^5F_1-z\ ^3P^\circ_2$
1528.756	20h	65412.7	$z\ ^5F^\circ_4-1_5$
1529.862	30	65365.4	$b\ ^5F_5-x\ ^3F^\circ_2$
1530.960	10	65318.5	
1531.757	5	65284.5	
1532.516	0	65252.2	$a\ ^5F_1-z\ ^3S^\circ_1$
1532.813	20h	65239.5	$z\ ^5F^\circ_4-3_5$
1534.092	40h	65185.1	$z\ ^5F^\circ_5-2_4$
1534.718	2	65158.6	$a\ ^5F_3-y\ ^5D^\circ_4$
1534.941	2	65149.1	$a\ ^5F_2-y\ ^5D^\circ_2$
1535.304	50	65133.7	$a\ ^5F_4-z\ ^5P^\circ_3$
1536.172	5H?	65096.9	$b\ ^5F_4-x\ ^3D^\circ_3$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1537.234	15	65051.9	$a\ ^3D_3 - v\ ^3D_2^0$
1538.140	10*h*	65013.6	
1538.319	3	65006.0	
1538.538	50*h*	64996.8	
1539.371	15*h*	64916.6	
1540.072	50	64932.0	
1540.496	5*h*	64914.2	
1541.031	15*h*	64891.6	$z\ ^5F_3^0 - 8_3$
1542.630	100	64824.4	
1542.859	20*h*	64814.7	
1543.034	15	64807.4	
1543.609	20*h*	64783.2	$z\ ^5F_3^0 - 7_{4,3}$
1543.955	2	64768.7	$a\ ^3P_2 - x\ ^3F_2^0$
1544.121	2	64761.8	
1545.127	30*h*	64719.6	
1545.605	3*h*	64699.6	
1545.953	200*h*	64685.0	$z\ ^5F_1^0 - 1_5$
1546.601	3*h*	64657.9	$z\ ^5F_2^0 - 6_4$
1547.656	20	64613.8	
1547.896	15*h*	64603.8	
1549.864	5	64521.8	
1550.048	5	64514.1	
1550.284	1	64504.3	
1550.743	5	64485.2	$b\ ^3P_1 - x\ ^3P_1^0$?
1550.860	5	64480.4	
1551.221	5*h*	64465.3	$a\ ^5F_1 - y\ ^5D_2^0$
1552.832	10*h*	64398.5	$z\ ^3D_3^0 - 9_5$
1553.917	15	64353.5	$b\ ^3F_4 - x\ ^3G_4^0$
1554.058	15	64347.7	
1555.002	15*h*	64308.6	$a\ ^3G_4 - y\ ^1F_3^0$
1557.013	10*h*	64225.5	
1557.570	2	64202.6	
1557.935	10	64187.5	
1559.067	10*h*	64140.9	
1560.091	10	64098.8	$a\ ^3D_1 - v\ ^3D_2^0$
1561.669	50*h*	64034.1	
1563.131	1	63974.2	$a\ ^5P_3 - y\ ^3G_3^0$
1564.622	20	63913.2	
1564.782	20	63906.7	
1565.210	20	63889.2	$a\ ^5F_2 - y\ ^5D_1^0$
1567.835	3	63782.2	
1571.016	5	63653.1	
1571.197	3*h*	63645.7	$b\ ^1G_4 - w\ ^3G_4^0$
1572.101	5	63609.1	
1573.295	20*h*	63560.9	$z\ ^5D_4^0 - 7_{4,3}$
1573.744	3	63542.7	$b\ ^3F_4 - x\ ^3D_3^0$
1574.844	5	63498.4	$z\ ^5G_3^0 - 9_5$
1575.128	50	63486.9	
1575.279	15	63480.8	$a\ ^5F_3 - z\ ^3P_2^0$
1575.492	1*h*	63472.2	
1575.806	5*h*	63459.6	$z\ ^5G_4^0 - 10_4$
1576.371	0	63436.8	$z\ ^5F_3^0 - 2_4$
1579.746	50	63301.3	$a\ ^5F_3 - z\ ^3P_2^0$
1580.275	5	63280.1	
1581.212	1*h*	63242.6	$a\ ^1F_3 - w\ ^3P_2^0$
1581.855	10	63216.9	$z\ ^5D_4^0 - 5_{5,4}$
1582.055	50	63208.9	$b\ ^3P_0 - x\ ^3P_1^0$
1582.110	50	63206.7	$a\ ^5F_1 - y\ ^3D_1^0$
1582.861	15	63176.7	
1583.047	10	63169.3	

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1584.167	10	63124.7	$a\ ^5F_1-y\ ^6D^0_{\frac{1}{2}}$
1584.445	1	63113.6	$a\ ^5D_2-v\ ^3D^0_{\frac{1}{2}}$
1584.637	3	63105.9	
1585.046	15h	63089.7	$a\ ^5P_3-x\ ^3D^0_3$
1585.258	15	63081.2	$a\ ^3H_4-w\ ^4G^0_4$
1586.982	3	63012.7	$b\ ^1G_4-w\ ^4G^0_3$
1591.033	3	62852.2	
1591.603	3	62829.7	$b\ ^3F_4-x\ ^4G^0_5$
1591.924	3	62817.1	$a\ ^3D_3-w\ ^3G^0_4$
1594.158	2	62729.0	$b\ ^3F_2-y\ ^4G^0_3$
1594.836	3h	62702.4	$a\ ^3H_4-v\ ^3D^0_3$
1596.892	300	62621.6	
1598.242	2	62568.7	
1600.637	1h	62475.1	$z\ ^5G^0_{\frac{3}{2}}-6_4$
1601.901	30	62425.8	$a\ ^3P_2-w\ ^3D^0_{\frac{1}{2}}$
1602.314	20	62409.7	
1602.489	20	62402.9	$b\ ^3F_3-x\ ^3D^0_3$ and $a\ ^3G_4-y\ ^3H^0_4$
1604.755	3	62314.8	$a\ ^3G_5-y\ ^3H^0_4$
1605.053	5	62303.2	$a\ ^3D_3-w\ ^3F^0_4$
1605.710	2h	62277.7	
1606.098	200h	62262.8	
1606.269	15	62256.1	$z\ ^5G^0_{\frac{3}{2}}-5_{3,4}$
1606.417	5	62250.3	$a\ ^3P_2-w\ ^3D^0_{\frac{1}{2}}$
1607.613	2h	62204.0	
1607.760	20	62198.3	$a\ ^5F_2-x\ ^5P^0_{\frac{1}{2}}$
1607.921	10	62192.1	
1608.127	0h	62184.2	$a\ ^3D_3-w\ ^3G^0_3$
1608.404	3	62173.4	$a\ ^3H_6-y\ ^1H^0_5$
1610.754	10h	62082.7	$b\ ^3F_4-y\ ^3D^0_3$
1610.972	1	62074.3	
1611.156	3h	62067.2	
1611.422	3	62057.0	
1612.025	3h	62033.8	$c\ ^3P_2-x\ ^3P^0_1$
1613.236	2h	61987.2	
1613.800	5	61965.5	
1613.983	5	61958.5	
1615.575	3h	61897.5	
1615.987	5h	61881.7	
1616.295	100	61869.9	$a\ ^5P_2-x\ ^3D^0_3$ and $b\ ^3F_4-z\ ^1G^0_4$
1616.746	1	61852.6	$a\ ^3G_3-y\ ^1G^0_4$
1616.941	1	61845.2	
1617.700	1h	61816.2	
1618.472	10h	61786.7	$z\ ^5G^0_{\frac{4}{2}}-10_4$
1618.700	2h	61778.0	
1619.088	20	61763.2	$b\ ^3F_3-x\ ^3G^0_3$
1619.244	100	61757.2	
1619.464	5	61748.8	
1619.598	5	61743.7	
1620.346	5	61715.2	$z\ ^5D^0_{\frac{4}{2}}-1_3$
1620.628	50	61704.5	
1620.905	50	61693.9	
1621.124	0	61685.6	$c\ ^3P_1-x\ ^3P^0_0$
1621.324	1h	61678.0	
1621.663	1	61665.1	
1621.831	2	61658.7	$b\ ^3F_3-x\ ^3G^0_3$
1622.106	5	61648.3	
1622.777	100	61622.8	$z\ ^5G^0_{\frac{4}{2}}-4_4$
1623.623	1	61590.7	$a\ ^3P_2-y\ ^1F^0_3$
1623.836	0	61582.6	
1624.295	10	61565.2	$a\ ^3G_4-y\ ^3H^0_{\frac{5}{2}}$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1625.073	2	61535.7	
1626.098	10*h*	61496.9	
1626.609	2*h*	61477.6	
1627.006	3	61462.6	
1628.091	5	61421.6	$b\ ^3F_2-w\ ^3D^\circ_1$
1629.118	5	61382.9	$a\ ^3F_2-z\ ^5P^\circ_1$
1629.327	3*h*	61375.0	
1629.484	20*h*	61369.1	$z\ ^5G^\circ_3-3_4$
1629.681	1	61361.7	$a\ ^5P_2-y\ ^3P^\circ_1$
1630.246	3	61340.4	
1630.355	20*h*	61336.3	
1630.836	150	61318.2	
1631.091	3*h*	61308.7	$z\ ^5G^\circ_3-3_5$
1631.836	5*h*	61280.7	$z\ ^3F^\circ_3-12_4$
1632.389	2	61259.9	
1632.558	3	61253.6	$a\ ^3G_4-y\ ^3H^\circ_5$
1632.669	5*h*	61249.4	
1633.365	15*h*	61223.3	$z\ ^3G^\circ_3-12_4$
1634.355	15	61186.2	$z\ ^3F^\circ_4-11_4$
1634.987	1	61162.6	
1635.518	3	61142.7	
1635.678	10	61136.7	
1635.758	10	61133.7	$b\ ^3F_2-w\ ^3D^\circ_2$
1635.984	30	61128.7	$z\ ^3G^\circ_5-11_4$
1636.838	1	61093.4	
1638.343	10	61037.3	$z\ ^5G^\circ_4-8_3$
1638.716	10	61023.4	
1639.271	1	61002.7	
1639.428	2	60996.9	$a\ ^3G_4-x\ ^3F^\circ_3$
1639.750	2	60984.9	
1640.049	0	60973.8	$a\ ^3G_6-z\ ^1I^\circ_6$
1640.928	1	60941.1	
1641.294	1	60927.5	$z\ ^5G^\circ_4-7_{4,3}$
1641.913	3	60904.6	$z\ ^5G^\circ_3-10_4$
1643.532	10*h*	60844.6	$z\ ^5D^\circ_2-8_2$
1643.758	15*h*	60836.2	
1644.092	2	60823.8	$b\ ^3F_3-y\ ^5P^\circ_2$
1644.311	5*h*	60815.7	$z\ ^5G^\circ_4-1_4$
1644.679	15*h*	60802.1	$z\ ^5G^\circ_4-6_4$
1645.689	5*h*	60764.8	
1645.977	5*h*	60754.2	$z\ ^5G^\circ_5-1_5$
1646.158	1	60747.5	
1647.440	10	60700.2	$a\ ^5F_1-z\ ^3P^\circ_1$
1648.443	3	60663.3	$a\ ^3G_3-y\ ^3H^\circ_4$
1648.859	10	60648.0	$a\ ^5F_4-z\ ^3D^\circ_3$
1649.257	1	60633.4	
1650.608	5	60583.7	$z\ ^5G^\circ_4-5_{5,4}$
1651.365	1	60556.0	
1651.529	30	60550.0	
1653.774	3	60467.8	$a\ ^3H_4-w\ ^3G^\circ_4$
1656.423	10	60371.1	$a\ ^5P_3-y\ ^3P^\circ_2$
1657.185	20	60343.4	
1658.392	10	60299.4	$b\ ^3F_2-y\ ^3F^\circ_2$
1658.788	2*h*	60285.0	
1658.925	5	60280.0	
1660.297	10	60230.2	
1660.363	10	60227.8	$a\ ^5P_1-y\ ^3F^\circ_2$
1660.754	2	60213.6	$a\ ^1H_5-x\ ^1G^\circ_4$
1660.809	2	60211.6	$b\ ^3F_4-z\ ^3H^\circ_4$
1663.199	1	60125.1	

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1663.620	3	60109.9	
1666.723	10	59998.0	$a\ ^4P_1-y\ ^4P_{\frac{1}{2}}$ and $b\ ^3P_2-z\ ^1D_{\frac{3}{2}}$
1667.045	10h	59986.4	$a\ ^5P_3-z\ ^1F_{\frac{5}{2}}$
1667.639	5	59965.0	
1667.804	5	59959.1	
1667.968	15	59953.2	$b\ ^3G_4-y\ ^1F_{\frac{5}{2}}$
1668.664	5h	59928.2	$z\ ^3F_{\frac{3}{2}}-12_4$
1668.873	1	59920.7	$z\ ^4G_{\frac{5}{2}}-6_4$
1669.068	1	59913.7	
1669.284	10h	59905.9	$a\ ^4P_2-z\ ^3F_{\frac{4}{2}}$
1670.361	1	59867.3	$c\ ^2F_4-x\ ^1F_{\frac{5}{2}}$
1670.795	0	59851.7	
1670.986	0	59844.9	
1671.090	1	59841.2	
1671.282	20	59834.3	$a\ ^5H_4-w\ ^5G_{\frac{5}{2}}$ and $z\ ^3F_{\frac{3}{2}}-11_4$
1672.313	15H7	59797.4	$a\ ^4F_4-z\ ^5G_{\frac{7}{2}}$
1672.878	5h	59777.2	$a\ ^3F_3-z\ ^4G_{\frac{5}{2}}$
1673.246	5	59764.1	$c\ ^2P_2-x\ ^3P_{\frac{3}{2}}$
1673.924	10	59739.9	$b\ ^4P_1-z\ ^1D_{\frac{3}{2}}$
1674.426	5h	59721.8	$a\ ^3F_2-z\ ^5D_{\frac{1}{2}}$
1674.669	5	59713.3	$b\ ^4P_1-z\ ^1P_{\frac{1}{2}}$
1675.331	20	59689.7	$a\ ^4P_2-z\ ^3P_{\frac{1}{2}}$
1676.580	3	59645.2	
1677.275	10h	59620.5	$a\ ^4D_1-x\ ^3P_{\frac{0}{2}}$
1678.112	30	59590.8	$a\ ^5F_5-z\ ^4G_{\frac{5}{2}}$
1679.731	50	59533.3	$a\ ^6F_6-z\ ^4F_{\frac{7}{2}}$
1681.162	3	59482.7	$a\ ^1P_1-v\ ^3D_{\frac{1}{2}}$
1682.478	5h	59436.1	$b\ ^3P_2-y\ ^3S_{\frac{1}{2}}$
1682.676	1	59429.1	$a\ ^4G_4-x\ ^3F_{\frac{3}{2}}$
1683.408	0	59403.3	
1684.379	0	59369.1	$a\ ^3D_1-x\ ^3P_{\frac{1}{2}}$
1685.790	50h	59319.4	$a\ ^3D_2-x\ ^3P_{\frac{1}{2}}$
1686.348	2	59299.7	$b\ ^3P_2-x\ ^3F_{\frac{3}{2}}$
1687.530	6	59258.2	$a\ ^5G_3-x\ ^3F_{\frac{4}{2}}$
1688.167	15h	59235.8	$b\ ^1G_4-y\ ^1G_{\frac{5}{2}}$
1688.438	5	59226.3	
1689.447	1	59191.0	
1689.547	1	59187.5	$a\ ^4P_3-y\ ^3D_{\frac{1}{2}}$
1689.809	30h	59178.3	$b\ ^3P_1-y\ ^3S_{\frac{1}{2}}$
1689.851	10	59176.8	$b\ ^5F_3-z\ ^1G_{\frac{4}{2}}$
1690.223	0	59163.8	$c\ ^2P_1-x\ ^3P_{\frac{2}{2}}$
1690.359	2	59159.0	
1691.343	5	59124.6	$a\ ^4D_3-y\ ^1F_{\frac{3}{2}}$
1693.736	15h	59041.1	$a\ ^3D_1-w\ ^3F_{\frac{2}{2}}$
1693.797	10	59039.0	$a\ ^4F_1-z\ ^4D_{\frac{1}{2}}$
1695.053	5	58995.2	$a\ ^5F_1-z\ ^5D_{\frac{0}{2}}$ and $a\ ^5F_2-z\ ^4F_{\frac{1}{2}}$
1695.282	30	58987.2	$a\ ^3D_3-x\ ^3P_{\frac{2}{2}}$
1695.480	5	58980.5	$b\ ^3F_4-y\ ^3F_{\frac{3}{2}}$
1696.487	5	58945.3	$a\ ^5F_2-z\ ^4D_{\frac{3}{2}}$
1696.760	50h	58935.9	$a\ ^5P_3-y\ ^3D_{\frac{4}{2}}$
1696.994	50	58927.7	$a\ ^5P_1-y\ ^3P_{\frac{2}{2}}$ and $a\ ^3D_3-w\ ^3G_{\frac{5}{2}}$
1698.283	5	58883.0	
1701.897	10	58758.0	
1702.667	10	58731.4	$a\ ^5F_3-y\ ^3D_{\frac{4}{2}}$
1704.330	100	58674.1	$a\ ^5F_2-z\ ^3G_{\frac{3}{2}}$
1704.436	20	58670.4	$a\ ^3H_4-y\ ^1G_{\frac{5}{2}}$
1704.670	1	58662.4	$a\ ^3D_1-y\ ^1P_{\frac{1}{2}}$
1705.435	3	58638.1	$a\ ^5G_4-y\ ^3G_{\frac{3}{2}}$
1706.061	2	58614.6	$b\ ^3F_2-z\ ^1F_{\frac{3}{2}}$
1706.400	50	58600.8	$b\ ^3F_4-y\ ^3F_{\frac{5}{2}}$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1708.251	5	58539.4	
1708.568	100	58528.5	$a\ ^5P_1-y\ ^5F_1^1$
1714.506	10	58325.8	$a\ ^5P_1-z\ ^5P_1^1$
1715.140	3	58304.3	$b\ ^3D_1-u\ ^3D_1^1$
1716.286	2	58265.3	$a\ ^3H_4-y\ ^1H_5^1$
1716.367	50	58262.6	$a\ ^5F_1-z\ ^5D_2^0$
1716.804	10	58247.8	$b\ ^3F_4-y\ ^1D_2^1$ and $c\ ^3P_0-y\ ^1P_1^1$
1719.856	200	58144.4	$a\ ^5F_4-z\ ^5G_5^0$
1720.015	3	58139.0	
1721.798	10	58078.8	$b\ ^1D_2-v\ ^3D_3^0$
1722.735	150	58047.2	$b\ ^1G_4-y\ ^3H_5^1$
1724.179	1	57998.6	$a\ ^3G_5-y\ ^3G_4^1$
1724.407	50	57991.0	$a\ ^5P_2-z\ ^5S_2^0$
1727.124	5	57899.7	$b\ ^3P_0-y\ ^3S_1^1$ and $z\ ^3D_3^1-11_4$
1727.209	2	57896.9	$b\ ^3F_2-y\ ^3D_1^1$
1727.375	100	57891.3	$a\ ^5F_2-z\ ^5D_3^0$ and $a\ ^3F_2-z\ ^3F_3^0$
1727.875	5	57874.6	$b\ ^3P_1-x\ ^3F_2^0$?
1728.162	10	57864.9	$b\ ^3D_2-u\ ^3D_1^1$
1729.125	40	57832.7	$a\ ^5F_1-z\ ^5G_2^0$
1730.245	40	57795.3	$a\ ^5P_3-y\ ^5D_4^1$
1731.974	50	57737.6	$b\ ^3F_4-y\ ^5D_4^1$
1732.634	250	57715.6	$a\ ^5P_2-y\ ^5D_3^1$
1734.273	3	57661.0	$b\ ^3F_4-z\ ^5P_3^0$
1738.140	1	57532.8	
1738.363	5	57525.4	$a\ ^5P_2-z\ ^3P_2^0$
1739.657	10	57482.6	$a\ ^3H_5-y\ ^3H_4^1$
1741.619	500	57417.8	$a\ ^5F_4-z\ ^3G_5^0$
1743.342	2	57361.1	$a\ ^5F_4-z\ ^5F_5^0$
1745.562	150	57288.1	$c\ ^3P_2-z\ ^1D_2^0$
1745.657	5	57285.0	$a\ ^5P_1-y\ ^5D_2^1$
1748.097	50	57205.06	$a\ ^5P_3-y\ ^5D_3^1$
1748.204	5	57201.56	$a\ ^3G_5-z\ ^1H_5^0$
1752.543	10	57059.94	$a\ ^5F_5-z\ ^5F_5^0$
1752.881	5	57048.94	$a\ ^1D_2-x\ ^3P_2^0$
1754.668	2	56990.84	$a\ ^3G_4-w\ ^3D_3^1$
1756.322	40	56937.17	$a\ ^3G_4-y\ ^3G_4^1$
1757.561	20	56897.03	$a\ ^3G_5-y\ ^3G_3^1$ and $b\ ^1G_4-y\ ^1H_5^1$
1758.187	400	56876.77	$a\ ^3H_6-y\ ^3H_6^1$
1759.356	3	56838.98	$b\ ^3P_1-x\ ^3D_1^1$
1761.339	3	56774.99	$a\ ^3H_4-y\ ^1F_3^1$
1762.852	5	56726.26	$c\ ^3P_2-y\ ^3S_1^1$
1764.219	50	56682.31	$c\ ^3F_3-v\ ^3D_1^1$
1764.883	0	56660.98	$c\ ^3P_1-z\ ^1P_1^0$
1765.403	200	56644.29	$b\ ^3F_3-y\ ^3D_2^1$
1765.908	2	56628.09	$a\ ^5P_1-z\ ^5S_2^0$
1766.458	5	56610.46	$a\ ^5G_4-x\ ^3D_3^0$
1766.652	5	56604.24	
1768.588	5	56542.3	$a\ ^5F_4-z\ ^5G_3^0$
1772.285	0	56424.33	$b\ ^3F_3-y\ ^3D_3^1$
1775.162	300	56332.89	$a\ ^3H_5-y\ ^3H_5^1$
1778.256	1	56234.87	$b\ ^3F_2-z\ ^3P_2^0$
1779.629	300	56191.49	$a\ ^5P_3-y\ ^3D_3^1$
1780.617	200	56160.31	$a\ ^5F_6-z\ ^5G_6^0$
1780.952	30	56149.74	$c\ ^3F_3-w\ ^3F_3^1$
1781.262	150	56139.97	$a\ ^3G_4-z\ ^1H_5^0$
1782.548	4000	56099.47	$a\ ^5F_6-z\ ^5G_5^0$
1784.367	300	56042.28	$a\ ^1H_5-y\ ^1H_5^1$
1786.419	150	55977.91	$a\ ^1F_3-x\ ^1F_3^0$
1786.666	5	55970.17	$a\ ^3G_4-x\ ^3G_3^0$
1787.091	10	55956.86	$a\ ^5F_5-z\ ^5P_4^0$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1789.987	200	55866.33	$a\ ^5G_4-x\ ^3G_3^\circ$
1790.106	2	55862.61	$c\ ^3F_2-v\ ^3D_3^\circ$
1790.772	100	55841.84	$a\ ^5P_1-y\ ^5D_1^\circ$
1792.274	5	55795.04	$b\ ^3P_1-x\ ^3D_2^\circ$
1793.533	2?	55755.87	$b\ ^3P_2-w\ ^3D_1^\circ$
1795.083	150	55707.73	$a\ ^5F_3-z\ ^5F_4^\circ$
1796.616	100	55660.20	$a\ ^5F_4-z\ ^5G_5^\circ$
1799.107	100	55583.13	$a\ ^3H_5-y\ ^3H_6^\circ$
1801.877	5	55497.68	$b\ ^3P_1-w\ ^3D_1^\circ$
1803.315	150	55453.43	$a\ ^5P_3-y\ ^5F_4^\circ$ and $c\ ^4F_3-v\ ^3D_2^\circ$
1804.176	75	55426.96	$c\ ^4P_1-t\ ^4S_2^\circ$
1804.908	400	55404.48	$a\ ^3G_4-x\ ^3G_3^\circ$
1808.544	250	55293.10	$b\ ^3P_2-w\ ^3D_2^\circ$
1809.873	3	55252.50	$a\ ^3G_2-w\ ^3D_2^\circ$
1811.605	150	55199.67	$a\ ^5F_5-z\ ^5D_4^\circ$ and $a\ ^3G_3-y\ ^3G_4^\circ$
1811.975	200	55188.40	$c\ ^3F_2-x\ ^1G_4^\circ$
1812.094	150	55184.77	$c\ ^3F_4-w\ ^3F_3^\circ$
1812.322	3	55177.83	$a\ ^3G_3-t\ ^3I_4^\circ$
1812.713	3	55165.93	$c\ ^3P_2-x\ ^3F_3^\circ$
1813.523	150	55141.29	$c\ ^3F_2-x\ ^1D_2^\circ$
1814.217	3	55120.20	$a\ ^1P_1-x\ ^3P_2^\circ$
1815.574	250	55079.00	$c\ ^3F_4-w\ ^3G_5^\circ$
1816.147	2	55061.62	$a\ ^5F_3-z\ ^5G_2^\circ$
1816.447	50	55052.53	$c\ ^3F_2-w\ ^3F_3^\circ$
1818.464	200	54991.46	$a\ ^3H_6-z\ ^1I_6^\circ$
1819.274	150	54966.98	$b\ ^3F_3-z\ ^3P_1^\circ$
1821.066	3	54912.9	$b\ ^3P_2-x\ ^3D_3^\circ$
1821.839	50	54889.59	$a\ ^5F_5-z\ ^5G_6^\circ$
1822.409	50	54872.42	$a\ ^3G_3-x\ ^3D_2^\circ$
1822.515	200	54869.23	$a\ ^3H_4-y\ ^3H_5^\circ$ and $a\ ^1P_1-x\ ^3P_1^\circ$
1823.774	1	53831.36	$a\ ^3D_1-y\ ^1D_2^\circ$
1825.654	50	54774.89	$a\ ^3G_3-y\ ^3G_3^\circ$
1828.670	3h	54654.66	$b\ ^3F_1-y\ ^3D_1^\circ$
1829.918	50	54647.26	$a\ ^3G_4-z\ ^3F_3^\circ$
1830.063	150	54642.93	$c\ ^3F_4-w\ ^3F_4^\circ$
1830.311	100	54635.52	$a\ ^5F_4-z\ ^5D_3^\circ$
1831.753	200	54592.51	$a\ ^3G_5-y\ ^3F_5^\circ$
1832.067	150	54583.16	$a\ ^3P_1-y\ ^3D_1^\circ$
1832.404	5	54573.12	$a\ ^3D_2-z\ ^1D_2^\circ$
1832.666	50	54565.32	$c\ ^3P_1-x\ ^3F_2^\circ$
1833.300	100	54546.45	$a\ ^1D_2-z\ ^1P_1^\circ$
1834.386	250	54514.15	$a\ ^5P_3-z\ ^5P_3^\circ$
1834.832	100	54500.90	$a\ ^5P_1-y\ ^5D_0^\circ$
1835.265	150	54488.04	$c\ ^3F_1-v\ ^3D_2^\circ$
1836.672	250	54446.30	$a\ ^3G_3-z\ ^1G_4^\circ$
1837.073	200	54434.42	$a\ ^5P_1-z\ ^5P_2^\circ$
1838.101	3h	54403.97	$b\ ^3P_0-y\ ^3P_1^\circ$
1838.594	10	54389.39	$a\ ^3D_1-x\ ^3F_2^\circ$
1840.166	50	54342.92	$a\ ^5G_4-x\ ^5G_3^\circ$
1840.438	30	54334.89	$a\ ^5P_1-z\ ^5P_2^\circ$
1842.305	10	54279.83	$b\ ^1G_4-y\ ^3G_3^\circ$
1842.546	1	54272.73	$b\ ^3P_2-x\ ^3G_3^\circ$
1843.148	150	54255.00	$a\ ^5P_2-z\ ^5P_3^\circ$
1843.490	400	54244.94	$a\ ^3D_3-x\ ^3F_4^\circ$
1843.940	250	54231.70	$a\ ^3G_3-x\ ^3G_4^\circ$
1845.020	50	54199.95	$a\ ^5F_3-z\ ^5D_2^\circ$
1845.945	10	54172.79	
1846.306	3	54162.20	$a\ ^3P_1-y\ ^1P_1^\circ$
1846.842	2	54146.5	$b\ ^3P_1-y\ ^3P_1^\circ$
1847.473	250	54127.99	$a\ ^3G_5-x\ ^3G_4^\circ$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity	Wave number	Identification
1849.755	5	54061.2	$a\,^4D_1-y\,^3S_1^0$
1851.592	1500	54007.58	$a\,^4F_3-z\,^3G_4^0$
1852.274	2000	53987.69	$a\,^4F_4-z\,^4G_5^0$
1853.283	15	53958.30	$a\,^4F_2-z\,^3G_3^0$
1856.161	200	53874.64	$a\,^4D_2-x\,^3F_3^0$
1856.504	50	53864.68	$a\,^4F_2-z\,^3D_1^0$
1857.558	200	53834.12	$a\,^1H_6-y\,^1G_5^0$
1859.206	1000	53786.40	$a\,^4F_2-z\,^4G_3^0$
1861.514	30	53719.71	$a\,^3H_4-y\,^3H_5^0$
1861.740	40	53713.19	$a\,^3G_4-y\,^3G_5^0$
1862.947	10	53678.39	$c\,^3F_4-w\,^3F_3^0$
1864.040	5	53646.9	$c\,^1P_0-y\,^3S_1^0$
1865.782	150	53596.83	$a\,^3G_4-y\,^3D_3^0$
1866.421	50	53578.48	$b\,^1D_2-y\,^1P_1^0$
1870.487	150	53463.44	$a\,^4H_4-x\,^3F_4^0$
1871.263	100	53439.84	$a\,^5P_2-z\,^4P_1^0$
1873.197	200	53384.67	$a\,^3G_4-z\,^1G_4^0$
1874.629	1500	53343.89	$a\,^3G_4-z\,^3H_5^0$
1874.969	15	53334.21	$b\,^3P_2-y\,^3P_2^0$
1875.469	100	53320.00	$a\,^5F_1-z\,^4D_2^0$
1877.027	400	53275.74	$a\,^5F_1-z\,^4G_2^0$
1879.041	15	53218.64	$c\,^3F_4-w\,^3G_4^0$
1880.064	250	53189.68	$a\,^4G_4-y\,^3F_3^0$
1880.326	300	53182.27	$a\,^5F_1-z\,^4D_1^0$
1880.547	50	53176.02	$b\,^3F_4-z\,^3D_3^0$
1881.382	3	53152.4	
1882.072	2	53132.9	
1883.352	500	53096.82	$a\,^3F_2-z\,^3D_3^0$
1884.080	5	53076.30	$b\,^3P_1-y\,^3P_1^0$
1885.334	2000	53026.94	$a\,^4F_4-z\,^5D_4^0$
1886.078	50	52994.79	$c\,^3F_3-w\,^3G_3^0$
1887.398	1000	52982.99	$a\,^4F_3-z\,^5D_2^0$
1888.070	15	52964.14	$b\,^3F_2-z\,^5P_2^0$
1888.575	1h	52949.98	$b\,^3P_2-z\,^1F_3^0$
1890.047	15	52908.74	$a\,^3G_3-z\,^1F_3^0$
1890.645	15	52892.00	$a\,^4P_1-z\,^5P_3^0$ and $b\,^4P_1-y\,^5P_3^0$
1891.341	1500	52872.54	$a\,^3H_6-z\,^3I_7^0$
1891.475	107	52868.79	$b\,^3P_0-y\,^3P_1^0$
1896.003	2	52742.5	$c\,^3P_1-x\,^3D_2^0$
1896.352	5	52732.82	$b\,^3P_2-z\,^3P_1^0$
1899.486	50	52645.82	$a\,^1H_5-y\,^3H_4^0$
1901.177	5	52598.99	$a\,^1P_1-x\,^3P_2^0$
1901.679	50	52586.11	$c\,^3F_3-w\,^3G_3^0$
1901.767	50	52582.68	$b\,^1G_4-y\,^3G_3^0$ and $c\,^3P_2-w\,^3D_3^0$
1904.255	2	52513.98	$a\,^4H_6-z\,^1H_5^0$
1904.721	75	52501.13	$a\,^4D_1-x\,^3F_2^0$
1905.673	2	52474.90	$b\,^3P_1-z\,^3P_2^0$
1906.122	50	52462.54	$b\,^3D_2-y\,^3F_3^0$
1906.529	20	52451.34	$a\,^3D_2-x\,^3F_3^0$
1906.768	5	52444.8	$c\,^3P_1-w\,^3D_2^0$
1907.874	20	52414.36	$a\,^5F_1-z\,^5D_2^0$
1913.729	150	52254.00	$c\,^3F_4-w\,^3G_4^0$
1914.616	4000	52229.79	$a\,^4F_5-z\,^5F_5^0$
1915.592	5	52203.18	$c\,^3P_2-x\,^3D_3^0$
1917.281	150	52157.20	$c\,^3P_1-w\,^3D_2^0$
1917.472	200	52152.00	$b\,^1D_2-y\,^1F_3^0$
1917.580	5	52149.06	$b\,^3F_2-z\,^5P_1^0$
1920.250	8	52076.55	$a\,^4P_1-e\,^5P_2^0$
1922.443	250	52017.15	$a\,^3H_5-y\,^3G_4^0$
1922.522	100	52015.01	$b\,^1D_2-x\,^3P_2^0$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity		Wave number	Identification
1924.061	10		51973.40	$b\,^3P_1-y\,^3D_1^0$
1925.324	30		51939.31	$a\,^3H_5-z\,^3I_5^0$
1925.472	300		51935.32	$a\,^3F_3-z\,^3F_4^0$
1926.254	5		51914.23	$a\,^3G_5-y\,^3D_4^0$
1926.770	500		51900.33	$a\,^1F_3-z\,^3F_3^0$ and $b\,^3P_2-y\,^3D_3^0$
1927.545	10		51879.46	$a\,^3F_2-z\,^3D_3^0$
1930.330	1000		51804.61	$a\,^5F_4-z\,^5F_5^0$
1931.090	400		51784.22	$b\,^1G_4-z\,^1H_5^0$
1931.293	5		51778.78	$a\,^3P_2-z\,^3D_1^0$
1932.729	5		51740.31	$c\,^3F_2-w\,^3F_3^0$
1933.324	40		51724.39	$a\,^3G_4-z\,^3H_5^0$
1933.442	30		51721.23	$a\,^3D_1-x\,^3D_2^0$
1934.439	15		51694.57	$b\,^3P_2-y\,^3D_3^0$ and $c\,^3P_2-y\,^3P_1^0$
1937.430	15		51614.77	$b\,^1G_4-x\,^3G_5^0$
1938.273	3h		51592.32	$b\,^3D_3-v\,^3F_3^0$
1939.404	1h		51562.23	$c\,^3P_2-x\,^3G_3^0$
1940.447	50		51534.52	$b\,^3F_3-z\,^3D_3^0$ and $b\,^1F_3-v\,^3D_3^0$
1941.262	20		51512.88	$a\,^3D_2-y\,^3G_3^0$
1941.332	100		51511.02	$b\,^1G_4-x\,^3G_4^0$
1941.639	2000		51502.88	$a\,^5F_5-z\,^4F_4^0$
1943.600	50		51450.9	$a\,^3G_4-y\,^3F_3^0$
1944.123	50		51437.07	$b\,^3P_1-y\,^3D_2^0$
1944.537	200		51426.12	$a\,^3D_1-x\,^3D_2^0$
	(LG)	(VG)		
1946.509	5	50	51374.02	$a\,^5F_4-z\,^5D_4^0$
1948.160	0	50	51330.49	$c\,^3F_4-w\,^4F_4^0$ and $b\,^3D_1-v\,^4F_2^0$
1948.460(v)	-------	20	51322.58	$c\,^3F_4-y\,^3F_3^0$
1949.048(v)	-------	100	51307.10	$c\,^3P_0-x\,^3D_1^0$
1949.483	5	50	51295.65	$a\,^1F_3-w\,^3F_4^0$
1950.459	5	50	51269.98	
1951.117(v)	-------	200	51252.69	$a\,^4F_1-z\,^3F_1^0$
1951.562	50	400	51241.01	$b\,^3F_4-z\,^1F_3^0$
1954.027	3	300	51176.37	$a\,^3G_4-y\,^3F_4^0$
1956.886	10	150	51101.60	$a\,^5H_4-y\,^5G_3^0$
1957.192	5	50	51093.61	$c\,^3P_1-y\,^3P_1^0$
1957.632	1	3	51082.12	$a\,^5P_2-z\,^4D_3^0$
1959.477	5	30	51034.03	$b\,^3P_2-z\,^3S_1^0$
1960.139	2	20	51016.79	$b\,^3D_2-w\,^3P_1^0$
1960.688	1	5	51002.51	$a\,^5P_2-z\,^5D_3^0$
1962.858	15	150	50946.12	$a\,^3H_5-x\,^3G_4^0$
1965.025	1	3	50889.94	$b\,^3D_2-v\,^3F_2^0$
1966.479	3	10	50852.31	$a\,^5G_4-y\,^5D_4^0$
1968.632	10	150	50796.70	$a\,^5F_2-z\,^5F_3^0$
1969.051	10	100	50785.89	$a\,^5D_4-x\,^4G_5^0$
1969.423	2	10	50776.29	$b\,^3P_1-z\,^3S_1^0$
1970.108	10	50	50758.64	$b\,^3P_2-y\,^3D_3^0$
1970.607	0	3	50745.79	$a\,^1H_5-y\,^3H_6^0$
1971.175	0	2	50731.16	$a\,^5P_3-z\,^3G_4^0$
1971.747	20	200	50716.45	$a\,^3H_6-x\,^3G_5^0$
1972.294	25	300	50702.38	$a\,^3G_5-z\,^3H_6^0$
1972.575	3	100	50695.21	$b\,^3P_0-y\,^3D_1^0$
1973.241	3	30	50678.05	$a\,^3D_1-x\,^3D_2^0$
1975.185	20	200	50628.17	$a\,^3D_2-x\,^3D_3^0$
1975.350	20	150	50623.94	$c\,^3P_2-y\,^3P_2^0$
1977.528	50	300	50568.18	$b\,^3P_2-z\,^3P_3^0$
1979.130	0	1	50527.25	$a\,^1G_4-z\,^3P_3^0$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity		Wave number	Identification
1980.609	5	50	50489.52	$a\,^3H_4 - z\,^1I_5^*$
1980.695	5	200	50487.33	$b\,^3F_3 - z\,^3D_2^*$
1980.860	5	200	50483.12	$b\,^3F_4 - z\,^3F_4^*$
1980.940	10	300	50481.08	$b\,^3F_3 - z\,^3D_3^*$
1984.886	5	50	50380.73	$a\,^3D_1 - w^3D_2^*$ and $b\,^3D_2 - w\,^3P_2^*$
1986.705	15	100	50334.60	$a\,^1F_3 - x\,^1G_4^*$
1986.856	15	150	50330.77	$a\,^3D_2 - w^3D_1^*$ and $a\,^1P_1 - y\,^1D_2^*$
1988.412	30	200	50291.39	$b\,^1G_4 - z\,^1F_3^*$
1990.470	3	10	50239.39	$c\,^3P_2 - z\,^1F_3^*$
1993.841	20h	200	50154.45	$a\,^1H_5 - z\,^1I_6^*$
1993.951	10	150	50151.68	$a\,^1F_3 - z\,^3F_4^*$
1995.105	1	2	50122.68	$a\,^1P_1 - z\,^1D_2^*$
1995.429	15	100	50114.54	$a\,^3F_1 - z\,^3F_2^*$ and $a\,^3G_4 - y\,^3F_3^*$
1996.168	2	20	50095.98	$a\,^1P_1 - z\,^1P_1^*$
1996.294	3	20	50092.82	$a\,^3D_1 - w^3D_2^*$
1996.545	30	300	50086.52	$a\,^3H_6 - y\,^3G_5^*$
1997.735	10	50	50056.69	$a\,^3F_4 - z\,^3F_3^*$
1998.802	10	200	50029.97	$a\,^3P_3 - z\,^3F_3^*$
1998.879	10	200	50028.04	$a\,^3P_3 - z\,^3D_3^*$
1999.099	5	100	50022.54	$c\,^3P_2 - z\,^3P_1^*$
2000.390	20	200	49990.25	$b\,^3P_1 - y\,^3D_2^*$
2000.554	40	300	49986.15	$a\,^3G_3 - z\,^3H_4^*$
2001.345	3	30	49966.40	$c\,^3P_0 - w\,^3D_1^*$
2002.159	50	800	49946.08	$b\,^3F_4 - z\,^3G_5^*$
2004.473	50	1000	49888.42	$b\,^3F_4 - z\,^3F_4^*$
2004.898	3	20	49877.85	$a\,^1F_3 - v\,^1D_2^*$
2005.295	0	2	49867.97	$a\,^3D_2 - w\,^3D_3^*$?
2006.119	10	50	49847.49	$a\,^3D_3 - y\,^3P_2^*$
2006.485	1	3	49838.40	$c\,^3P_1 - y\,^3P_0^*$
2010.174	3	10	49746.94	$b\,^1D_2 - y\,^1D_2^*$
2010.504	5	75	49738.77	$b\,^1P_1 - z\,^3P_2^*$
2011.613	50	250	49711.35	$b\,^3F_2 - z\,^3D_3^*$
2014.478	50	500	49640.65	$a\,^3G_4 - z\,^3H_5^*$
2014.868	50	500	49631.04	$b\,^3F_2 - z\,^3G_3^*$
2018.623	15	75	49538.72	$b\,^1D_2 - z\,^1D_2^*$
2019.151	2	15	49525.77	$c\,^3F_2 - y\,^1F_3^*$
2019.332	2	15	49521.33	$c\,^3P_2 - y\,^3D_1^*$
2019.820	10	75	49509.36	$b\,^3D_2 - w\,^3P_2^*$
2020.690	1	5	49488.05	$a\,^3D_2 - x\,^3D_3^*$
2022.653	100	500	49440.02	$b\,^3F_3 - z\,^3G_4^*$
2023.375	2h	25	49422.38	$a\,^3H_5 - x\,^3G_4^*$ and $c\,^3P_1 - z\,^3P_1^*$
2025.582	5	35	49368.53	
2026.043	5	150	49357.29	$b\,^1G_4 - y\,^1G_4^*$
2027.158	20	300	49330.16	$a\,^5F_4 - z\,^5F_4^*$
2027.353	30	500	49325.40	$a\,^3H_4 - z\,^3I_5^*$
2030.110	3	10	49258.41	$a\,^3D_1 - y\,^3F_2^*$
2030.828	3	5	49241.00	$b\,^1G_4 - y\,^1D_2^*$
2032.699	50	500	49195.68	$a\,^3H_5 - z\,^3I_6^*$
2032.975	20	200	49189.00	$c\,^3P_2 - y\,^3D_3^*$
2033.419	30	400	49178.26	$a\,^3P_2 - z\,^3G_3^*$
2036.077	1	2	49114.06	$a\,^3G_3 - y\,^3D_2^*$
2038.804	1	2	49048.36	$a\,^5F_2 - z\,^5F_3^*$
2039.610	10	200	49028.98	$b\,^1G_4 - z\,^1G_3^*$
2041.268	2	20	48989.16	$b\,^3P_1 - y\,^3D_1^*$
2041.441	5	200	48985.01	$c\,^3P_2 - y\,^3D_2^*$
2041.787	0	2	48976.71	$b\,^1D_2 - y\,^3S_1^*$
2044.125	3	50	48920.69	$c\,^3P_1 - y\,^5D_0^*$
2047.177	2	10	48847.75	$a\,^3D_2 - x\,^3G_3^*$
2047.500	2	10	48840.05	$b\,^1D_2 - x\,^3F_3^*$
2047.758	3	25	48833.90	$b\,^1G_4 - y\,^5F_5^*$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity		Wave number	Identification
2049.945	3	25	48781.80	$c\ ^3P_2-y\ ^3F_3^0$
2055.110	30	500	48659.20	$b\ ^3F_2-z\ ^3F_3^0$
2055.271	3	5	48655.38	$a\ ^3H_4-z\ ^1H_5^0$
2056.415	3	20	48651.98	
2957.352	1	10	48606.17	$a\ ^3H_4-z\ ^1H_4^0$
2059.277	3	50	48560.73	$c\ ^3F_4-y\ ^1F_3^0$
2059.881	10	150	48546.49	$b\ ^3F_3-z\ ^3F_3^0$
2063.381	2	25	48464.15	$a\ ^3H_5-z\ ^1G_4^0$
2064.565	1	10	48436.35	$a\ ^3H_4-x\ ^3G_5^0$
2065.587	0?	0	48412.39	$a\ ^3D_3-y\ ^1D_2^0$
2066.802	0?	1	48383.93	$c\ ^3P_1-y\ ^3D_2^0$
2067.148	1	15	48375.83	$a\ ^5G_2-y\ ^3F_1^0$
2067.639	10	150	48364.34	$a\ ^1F_3-w\ ^3G_4^0$
2069.356	5	20	48324.21	$c\ ^3P_2-z\ ^5S_1^0$
2074.349	1	2	48207.90	$a\ ^3D_3-y\ ^1D_2^0$
2075.205	100	200	48188.01	$b\ ^3F_2-z\ ^5G_3^0$
2079.268	10	75	48093.85	$a\ ^1P_1-z\ ^3F_2^0$
2081.225	5	15	48048.63	$c\ ^3P_1-y\ ^1D_1^0$
2083.106	2	5	48005.24	$a\ ^3D_2-y\ ^3F_1^0$
2089.500	3	10	47858.34	$c\ ^3P_2-z\ ^3P_2^0$
2095.073	0	1	47731.03	$a\ ^1F_3-w\ ^3G_3^0$
2095.400	2	10	47723.58	$c\ ^3P_1-z\ ^3S_1^0$
2097.436	1	5	47677.26	$a\ ^5F_4-z\ ^5F_5^0$
2098.436	2	10	47654.54	
2099.959	2	10	47619.98	$c\ ^3F_3-y\ ^3H_4^0$
2103.919	2	10	47530.35	$c\ ^3F_2-y\ ^1D_2^0$
2104.175	10	50	47524.56	$a\ ^3D_3-z\ ^1F_3^0$
2106.269	5	25	47477.32	$b\ ^3P_2-z\ ^5P_3^0$
2107.358	5	20	47452.78	$b\ ^3P_0-y\ ^3D_1^0$
2111.082	30	200	47369.07	$b\ ^1G_4-z\ ^3H_5^0$
2111.406	2	5	47361.81	$a\ ^3H_4-z\ ^3H_5^0$
2111.600	1	2	47357.45	$a\ ^3D_1-z\ ^3P_1^0$
2113.820	2	5	47307.72	$a\ ^3D_2-z\ ^3P_1^0$
2113.980	2	10	47304.14	
2114.253	3	20	47295.79	$c\ ^3F_2-z\ ^1P_1^0$
2115.413	5	25	47272.09	$a\ ^3D_3-y\ ^3D_2^0$
2116.077	0?	0	47257.26	$a\ ^3G_3-z\ ^5P_3^0$ and $c\ ^3P_1-z\ ^3P_2^0$
2118.912	0	1	47194.03	$b\ ^3F_3-z\ ^3F_4^0$
2119.551	50	150	47179.80	$a\ ^1H_5-y\ ^3G_4^0$
2120.277	5	20	47163.65	$b\ ^3F_4-z\ ^3D_3^0$
2122.204	3	10	47120.82	$c\ ^3F_3-y\ ^1D_2^0$
2122.544	3	10	47113.28	$a\ ^3H_4-z\ ^1F_3^0$
2123.070	5	20	47101.60	$a\ ^1H_5-z\ ^1I_6^0$
2123.967	5	50	47081.71	$a\ ^3D_3-z\ ^3P_2^0$
2124.351	30	200	47073.20	$b\ ^3F_3-z\ ^5S_2^0$
2125.851	3	20	47039.99	$b\ ^3P_1-z\ ^3P_2^0$
2130.495	1	1	46937.45	$c\ ^3P_1-y\ ^5D_2^0$
2131.632	0	0	46912.41	$c\ ^3F_2-z\ ^1D_2^0$
2136.530	2	15	46804.87	$a\ ^5H_5-z\ ^5H_5^0$
2138.506	1	5	46761.62	$a\ ^3D_3-y\ ^5D_2^0$
2139.438	1	3	46741.25	$a\ ^3P_2-z\ ^5F_3^0$
2140.286	1	3	46722.73	$b\ ^3F_2-z\ ^3F_3^0$
2144.988	50	400	46620.31	$a\ ^3P_2-z\ ^5S_2^0$
2148.663	50	300	46540.57	$a\ ^3P_2-z\ ^3S_2^0$
2149.815	50	500	46515.63	$b\ ^3F_4-z\ ^5G_5^0$
2150.681	0	0	46496.90	$b\ ^1G_4-y\ ^5D_3^0$
2151.339	30	75	46482.68	$b\ ^3P_2-z\ ^3P_1^0$
2151.604	15	75	46478.95	$a\ ^1F_3-w\ ^3F_3^0$
2156.290	2	5	46375.95	$b\ ^3F_3-z\ ^5G_3^0$
2158.899	2	3	46319.91	$a\ ^3D_1-y\ ^5D_2^0$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Vac)	Intensity		Wave number	Identification
2161. 226	2	5	46270. 03	$a\ ^3D_2 - y\ ^5D_{4\frac{1}{2}}$
2163. 367	5	20	46224. 24	$b\ ^3P_1 - z\ ^5P_1$?
2165. 551	1	5	46177. 62	$a\ ^1P_1 - x\ ^3D_{2\frac{1}{2}}$
2168. 785	1	2	46109. 34	$a\ ^1H_5 - x\ ^5G_{4\frac{1}{2}}$
2170. 757	3	5	46066. 88	$a\ ^3D_2 - y\ ^5F_{3\frac{1}{2}}$
2173. 219	50	100	46014. 69	$a\ ^1H_4 - z\ ^3H_{5\frac{1}{2}}$
2177. 550	20	500	45923. 17	$a\ ^3P_2 - z\ ^5G_{3\frac{1}{2}}$
2177. 625	30		45921. 59	$a\ ^3P_2 - z\ ^5D_{1\frac{1}{2}}$
2180. 990	3	15	45850. 74	$a\ ^3H_4 - z\ ^1G_{4\frac{1}{2}}$
2185. 368	5	15	45758. 88	$b\ ^1G_4 - y\ ^3F_{3\frac{1}{2}}$
2188. 840	5	15	45686. 30	$b\ ^3F_5 - z\ ^3D_{3\frac{1}{2}}$
2189. 220	2	5	45678. 37	$c\ ^3P_1 - y\ ^5D_{3\frac{1}{2}}$
2190. 311	15	20	45655. 62	$a\ ^3H_4 - y\ ^3F_{4\frac{1}{2}}$
2193. 162	1	3	45596. 27	$c\ ^3P_1 - y\ ^3D_{0\frac{1}{2}}$
2195. 157	2	10	45554. 83	$b\ ^1F_4 - z\ ^3D_{1\frac{1}{2}}$
2197. 537	2	2	45505. 49	$c\ ^3F_4 - y\ ^3H_{4\frac{1}{2}}$
λ (Air)				
2197. 414	50		45493. 83	$b\ ^3F_4 - z\ ^5G_{3\frac{1}{2}}$
2209. 297	2		45249. 16	$c\ ^3F_4 - x\ ^3F_{3\frac{1}{2}}$
2212. 815	15		45177. 23	$a\ ^5P_1 - z\ ^5S_{2\frac{1}{2}}$
2219. 512	1		45040. 93	$a\ ^5P_3 - z\ ^3G_{4\frac{1}{2}}$
2221. 113	1?		45008. 47	$b\ ^1D_2 - w\ ^3D_{3\frac{1}{2}}$
2226. 444	1		44900. 71	$a\ ^3G_3 - z\ ^3G_{4\frac{1}{2}}$
2230. 382	1		44821. 44	$b\ ^3P_2 - z\ ^3D_{3\frac{1}{2}}$
2233. 079	15		44767. 29	$c\ ^3P_2 - z\ ^3P_{1\frac{1}{2}}$
2236. 636	5		44696. 12	$a\ ^5P_3 - z\ ^5D_{3\frac{1}{2}}$
2236. 971	3		44689. 43	$a\ ^5G_4 - z\ ^3D_{3\frac{1}{2}}$
2239. 923	3		44630. 56	$b\ ^3F_2 - z\ ^5D_{1\frac{1}{2}}$
2242. 548	15		44558. 44	$a\ ^5P_1 - z\ ^5D_{1\frac{1}{2}}$
2243. 865	15		44552. 14	$b\ ^3F_4 - z\ ^5G_{3\frac{1}{2}}$
2248. 054	5		44469. 13	$b\ ^3F_3 - z\ ^5D_{2\frac{1}{2}}$
2253. 671	50		44358. 31	$a\ ^1H_5 - z\ ^3I_{6\frac{1}{2}}$
2271. 183	3		44016. 31	$a\ ^5P_3 - z\ ^3F_{3\frac{1}{2}}$
2271. 786	5		44004. 63	$a\ ^3G_3 - z\ ^3D_{2\frac{1}{2}}$
2272. 429	3		43992. 18	$a\ ^5P_2 - z\ ^5F_{1\frac{1}{2}}$
2272. 683	3		43987. 27	$c\ ^3P_1 - z\ ^3P_{2\frac{1}{2}}$
2275. 310	20		43936. 48	$a\ ^5P_2 - z\ ^5D_{4\frac{1}{2}}$
2279. 155	5		43862. 37	$b\ ^3F_2 - z\ ^3D_{2\frac{1}{2}}$
2279. 674	2		43852. 38	$c\ ^3F_3 - y\ ^3G_{3\frac{1}{2}}$
2282. 893	15		43790. 55	$a\ ^5P_1 - z\ ^5D_{4\frac{1}{2}}$
2283. 059	15		43787. 37	$b\ ^3P_1 - z\ ^3D_{1\frac{1}{2}}$
2288. 604	10		43681. 29	$c\ ^3F_4 - x\ ^3F_{4\frac{1}{2}}$
2291. 446	100		43627. 12	$a\ ^1H_5 - z\ ^1G_{4\frac{1}{2}}$
2304. 155	3		43386. 51	$b\ ^3F_3 - z\ ^5F_{2\frac{1}{2}}$
2309. 531	30		43285. 52	$b\ ^3P_0 - z\ ^3D_{1\frac{1}{2}}$
2326. 609	5		42967. 82	$c\ ^3F_3 - x\ ^3D_{3\frac{1}{2}}$
2328. 456	3		42933. 74	$a\ ^5P_3 - z\ ^3F_{2\frac{1}{2}}$
2332. 796	20		42853. 87	$a\ ^5P_3 - z\ ^3F_{3\frac{1}{2}}$
2339. 280	10		42735. 10	$b\ ^3P_1 - z\ ^3F_{2\frac{1}{2}}$
2341. 146	5		42701. 05	$b\ ^3F_2 - z\ ^5F_{1\frac{1}{2}}$
2344. 206	3		42645. 31	$b\ ^3F_2 - z\ ^3D_{2\frac{1}{2}}$
2345. 108	2		42628. 90	$a\ ^5P_1 - z\ ^5F_{1\frac{1}{2}}$
2352. 769	10		42490. 11	$b\ ^1D_2 - z\ ^1F_{3\frac{1}{2}}$
2354. 230	40		42463. 74	$a\ ^3G_5 - z\ ^3F_{4\frac{1}{2}}$
2357. 346	30		42407. 62	$a\ ^5P_3 - z\ ^5D_{4\frac{1}{2}}$
2358. 748	1		42382. 41	$c\ ^3F_3 - w\ ^3D_{2\frac{1}{2}}$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Air)	Intensity	Wave number	Identification
2371.514	10	42154.29	$c\ ^5F_3-y\ ^3G_{\frac{1}{2}}$
2374.180	5	42106.95	$a\ ^3H_4-z\ ^1H_{\frac{5}{2}}$
2382.102	1	41966.93	$a\ ^1H_5-z\ ^3H_{\frac{4}{2}}$
2390.045	3	41827.47	$c\ ^5F_3-x\ ^3D_{\frac{1}{2}}$
2400.907	5	41638.25	$b\ ^5F_3-z\ ^5F_{\frac{1}{2}}$
2403.297	5	41596.85	$c\ ^5F_2-x\ ^3G_{\frac{3}{2}}$
2405.273	10	41562.68	$b\ ^5F_2-z\ ^5F_{\frac{3}{2}}$
2409.452	3	41490.60	$a\ ^5P_1-z\ ^5F_{\frac{1}{2}}$
2411.244	1	41459.76	$a\ ^3G_4-z\ ^3G_{\frac{5}{2}}$
2432.034	30	41105.38	$a\ ^5P_2-z\ ^5F_{\frac{3}{2}}$
2434.468	2	41064.28	$c\ ^3P_2-z\ ^3G_{\frac{3}{2}}$
2452.415	100	40763.79	$a\ ^3G_5-z\ ^5G_{\frac{7}{2}}$
2463.281	10	40583.99	$a\ ^3G_4-z\ ^3G_{\frac{3}{2}}$
2464.800	1	40558.98	$a\ ^3D_2-z\ ^3D_{\frac{3}{2}}$
2474.980	3	40392.16	$c\ ^3F_4-z\ ^1H_{\frac{5}{2}}$
2477.138	20	40356.98	$a\ ^1H_4-y\ ^3F_{\frac{1}{2}}$
2481.424	3	40287.28	$a\ ^3D_2-z\ ^3G_{\frac{3}{2}}$
2482.262	0	40273.68	$c\ ^3F_3-x\ ^1F_{\frac{3}{2}}$
2485.440	15	40222.19	$c\ ^3F_4-x\ ^3G_{\frac{5}{2}}$
2491.862	10	40118.53	$c\ ^3F_4-x\ ^3G_{\frac{7}{2}}$
2512.510	3	39788.86	$b\ ^1D_2-y\ ^3D_{\frac{3}{2}}$
2527.320	10	39555.71	$c\ ^3F_2-y\ ^3D_{\frac{1}{2}}$
2530.563	30	39505.02	$a\ ^5D_3-z\ ^3D_{\frac{3}{2}}$
2537.507	5	39396.92	$a\ ^5D_1-z\ ^3D_{\frac{1}{2}}$
2548.741	20	39223.29	$c\ ^3F_2-y\ ^3D_{\frac{3}{2}}$
2552.613	40	39163.79	$b\ ^5F_3-z\ ^5F_{\frac{4}{2}}$
2562.201	3	39017.25	$a\ ^3G_3-z\ ^5G_{\frac{2}{2}}$
2568.684	10	38918.78	$a\ ^5H_5-z\ ^3G_{\frac{7}{2}}$
2582.478	50	38710.91	$a\ ^5P_3-z\ ^5F_{\frac{4}{2}}$
2585.251	2	38669.39	$b\ ^3D_2-v\ ^3D_{\frac{3}{2}}$
2586.231	2	38654.74	$a\ ^3D_3-z\ ^3G_{\frac{7}{2}}$
2588.606	10	38620.77	$a\ ^3D_2-z\ ^3D_{\frac{3}{2}}$
2589.796	5	38601.53	$c\ ^5F_3-z\ ^1G_{\frac{7}{2}}$
2590.233	5	38595.02	$c\ ^3F_4-x\ ^3G_{\frac{7}{2}}$
2603.449	5	38399.10	$b\ ^1G_4-z\ ^3F_{\frac{3}{2}}$
2606.982	30	38347.08	$c\ ^3P_2-z\ ^3F_{\frac{3}{2}}$
2633.216	100	37965.06	$c\ ^3F_4-y\ ^1G_{\frac{7}{2}}$
2634.993?	0	37939.46	$b\ ^3P_1-z\ ^5D_{\frac{3}{2}}$
2635.019?	0	37939.08	$a\ ^3H_4-z\ ^3G_{\frac{5}{2}}$
2641.307	15	37848.77	$c\ ^3F_4-y\ ^3D_{\frac{3}{2}}$
2642.389	30	37833.27	$a\ ^3H_6-z\ ^3G_{\frac{5}{2}}$
2656.200	2	37636.57	$c\ ^5F_4-z\ ^1G_{\frac{7}{2}}$
2660.878	30	37570.40	$a\ ^3D_3-z\ ^5F_{\frac{3}{2}}$
2661.512	10	37561.26	$b\ ^3D_2-w\ ^3F_{\frac{1}{2}}$
2667.088	3	37482.93	$c\ ^5F_3-z\ ^5P_{\frac{2}{2}}$
2669.224	3	37452.94	$b\ ^5D_1-x\ ^1D_{\frac{2}{2}}$
2690.055	3	37162.93	$c\ ^3F_3-y\ ^3D_{\frac{2}{2}}$
2690.583	2	37155.64	$a\ ^3H_4-z\ ^3D_{\frac{3}{2}}$
2699.478	2	37033.21	
2700.920	5	37013.44	$b\ ^3D_2-x\ ^1D_{\frac{2}{2}}$
2706.182	2	36941.48	$c\ ^3F_3-z\ ^3H_{\frac{4}{2}}$
2707.428	15	36924.48	$b\ ^5D_2-w\ ^3F_{\frac{1}{2}}$
2711.170	20	36873.52	$c\ ^3P_2-z\ ^3S_{\frac{1}{2}}$
2711.830	10	36864.54	$b\ ^3D_3-v\ ^3D_{\frac{1}{2}}$
2722.362	3	36709.80	$c\ ^5F_4-y\ ^5D_{\frac{2}{2}}$?
2740.287	40	36481.74	$a\ ^5H_6-z\ ^5F_{\frac{1}{2}}$
2752.981	10	36313.53	$c\ ^3F_2-y\ ^5D_{\frac{1}{2}}$
2759.369	15	36229.46	$a\ ^1F_3-x\ ^3G_{\frac{1}{2}}$
2765.868	15	36144.34	$b\ ^3D_3-x\ ^1D_2$?
2771.623	3	36069.29	$c\ ^3F_3-y\ ^5D_{\frac{1}{2}}$

TABLE 1. *List of lines of* Pd III—Continued

Wavelength λ (Air)	Intensity	Wave number	Identification
2788.880	2	35846.12	$a\ ^5G_4 - z\ ^3F_3^\circ$
2803.903	0	35654.07	$c\ ^3P_1 - z\ ^5D_1^\circ$
2805.109	0	35638.74	$b\ ^3P_1 - z\ ^3F_2^\circ$
2805.622	0	35632.22	$a\ ^3D_2 - z\ ^4F_3^\circ$
2816.152	1	35499.00	$b\ ^3P_0 - z\ ^3F_1^\circ$
2829.496	30	35331.59	$c\ ^4F_4 - y\ ^3F_4^\circ$
2855.481	10	35010.08	$a\ ^1F_3 - z\ ^1F_3^\circ$
2865.653	15d7	34885.82	$c\ ^3P_1 - x\ ^5D_2^\circ$
2867.235	5	34866.57	$b\ ^3D_2 - w\ ^5G_3^\circ$
2884.642	2	34656.18	
2886.811	20	34630.15	$b\ ^3D_3 - w\ ^5G_4^\circ$
2896.227	15	34517.56	$a\ ^3D_2 - z\ ^5G_3^\circ$
2903.308	20	34433.38	$a\ ^3G_5 - z\ ^5F_4^\circ$
2905.890	30	34402.79	$a\ ^3H_4 - z\ ^5G_5^\circ$
2909.303	1	34362.43	$b\ ^1D_2 - z\ ^3D_1^\circ$
2917.191	5	34269.52	$c\ ^3P_2 - z\ ^5D_3^\circ$
2922.030	20	34212.77	$c\ ^3F_4 - z\ ^5P_3^\circ$
2927.543	5	34148.35	$b\ ^3P_2 - z\ ^5F_3^\circ$
2935.841	5	34051.83	$b\ ^3D_1 - w\ ^3F_2^\circ$
2949.616	15	33892.81	$c\ ^3F_2 - z\ ^3H_3^\circ$
2987.648	3	33461.38	$a\ ^3D_2 - z\ ^5G_2^\circ$
2990.708	5	33427.15	$c\ ^3F_4 - z\ ^5P_3^\circ$

TABLE 2. Pd III *even levels*

Configuration	Name	Observed	Calculated	Obs-Calc	Name (Shadmi)
$4d^8$	$a\ ^3F_4$	0.00	2	−2	
$4d^8$	$a\ ^3F_3$	3229.8	3227	2	
$4d^8$	$a\ ^3F_2$	4687.5	4728	−40	
$4d^8$	$a\ ^1D_2$	10229.3	10330	−101	$^3P_2$
$4d^8$	$a\ ^3P_1$	13468.9	13394	75	
$4d^8$	$a\ ^3P_0$	13697.5	13636	62	
$4d^8$	$a\ ^3P_2$	14634.4	14768	−134	$^1D_2$
$4d^8$	$a\ ^1G_4$	17879.3	17824	55	
$4d^8$	$a\ ^1S_0$		41196		
$4d^7(^4F)5s$	$a\ ^4F_5$	52916.0	52885	31	
$4d^7(^4F)5s$	$a\ ^4F_4$	55088.6	55040	49	
$4d^7(^4F)5s$	$a\ ^4F_3$	56741.64	56697	45	
$4d^7(^4F)5s$	$a\ ^4F_2$	57844.93	57806	39	
$4d^7(^4F)5s$	$a\ ^4F_1$	58527.3	58492	35	
$4d^7(^4F)5s$	$b\ ^4F_4$	62560.75	62397	164	
$4d^7(^4F)5s$	$b\ ^4F_3$	65255.08	65181	74	
(^4P)	$a\ ^4P_3$	65707.92	65689	19	
(^4P)	$a\ ^4P_2$	65787.75	65817	−29	
(^4F)	$b\ ^4F_2$	67078.93	66986	93	
(^4P)	$a\ ^4P_1$	67151.03	67195	−44	
(^2G)	$a\ ^2G_5$	69985.44	70034	−49	
(^2G)	$a\ ^2G_4$	71047.05	71027	20	
(^2P)	$b\ ^2P_2$	72744.82	72859	−114	
(^2G)	$a\ ^2G_3$	72785.64	72791	−5	
(^2P)	$b\ ^2P_1$	73002.81	73096	−93	
(^2P)	$b\ ^2P_0$	74280.92	74320	−39	
(^2H)	$a\ ^2H_4$	74673.57	74741	−67	
(^2G)	$b\ ^2G_4$	75402.52	75336	67	
(^2P)	$c\ ^2P_2$	75454.65	75447	8	
(^2H)	$a\ ^2H_3$	75967.39	75971	−4	
(^2P)	$c\ ^2P_1$	76055.46	76193	−138	
$(a\ ^2D)$	$a\ ^2D_3$	76231.26	76235	−4	
$(a\ ^2D)$	$a\ ^2D_2$	78119.50	78210	−90	
$(a\ ^2D)$	$a\ ^2D_2$	78169.48	78125	44	
(^2P)	$c\ ^2P_0$	78533.8	78682	−148	
(^2H)	$a\ ^2H_4$	78580.62	78525	56	
(^2H)	$a\ ^2H_5$	80804.43	80802	2	
(^2P)	$a\ ^2P_1$	82619.94	82809	−189	

TABLE 2. Pd III *even levels*—Continued

Configuration	Name	Observed	Calculated	Obs-Calc	Name (Shadmi)
($a\,^3$D)	$b\,^1D_2$	83203.94	83113	91	
(^{3}F)	$c\,^3F_3$	85420.33	85494	−74	
(^{3}F)	$c\,^3F_3$	85829.98	85940	−110	
(^{3}F)	$c\,^3F_4$	86794.85	86937	−142	
(^{3}F)	$a\,^1F_3$	90684.00	90857	−173	
($b\,^3$D)	$b\,^3D_1$	103109.0	102858	251	
($b\,^3$D)	$b\,^3D_2$	103548.42	103296	252	
($b\,^3$D)	$b\,^3D_3$	104418.18	104124	294	
($b\,^3$D)	$^1D_2$		108183		
$4d^7(^4F)6s$ or $4d^7(^4F)5d$	1_5	169831.0			
	2_4	170330.2?			
	3_3	170384.7			
	4_4	170638.4?			
	$5_{5,4}$	171332.5			
	6_4	171551.5			
	$7_{4,3}$	171676.6			
	8_3	171785.7?			
	9_5	172573.9			
	10_4	172535.8			
	11_4	173635.8			
	12_4	173730.0			

TABLE 3. Pd III *odd levels*

Configuration	Name	Observed	Calculated	Obs-Calc	Name (Shimoni)
$4d^7(^4F)5p$	$z\,^5F_5^\circ$	104418.86	104535	−116	
$4d^7(^4F)5p$	$z\,^5F_4^\circ$	105145.6	105030	116	
$4d^7(^4F)5p$	$z\,^5F_3^\circ$	106893.27	106934	−41	
$4d^7(^4F)5p$	$z\,^5D_4^\circ$	108115.59	107968	148	
$4d^7(^4F)5p$	$z\,^5F_2^\circ$	108641.62	108637	5	
$4d^7(^4F)5p$	$z\,^5G_6^\circ$	109015.5	108675	340	
$4d^7(^4F)5p$	$z\,^5G_5^\circ$	109076.37	108884	192	
$4d^7(^4F)5p$	$z\,^5D_3^\circ$	109724.26	109622	102	
$4d^7(^4F)5p$	$z\,^5F_1^\circ$	109779.95	109760	20	
$4d^7(^4F)5p$	$z\,^5G_4^\circ$	110748.86	110496	253	
$4d^7(^4F)5p$	$z\,^5D_2^\circ$	110941.34	110870	71	
$4d^7(^4F)5p$	$z\,^5G_3^\circ$	111631.06	111370	261	
$4d^7(^4F)5p$	$z\,^5D_1^\circ$	111709.50	111759	−49	
$4d^7(^4F)5p$	$z\,^5G_2^\circ$	111802.44	111606	196	
$4d^7(^4F)5p$	$z\,^5D_0^\circ$	111847.15	111962	−115	
(^{4}P)	$z\,^4S_3^\circ$	112328.25	112717	−389	
(^{4}F)	$z\,^3F_4^\circ$	112449.15	112383	66	
(^{4}F)	$z\,^5G_6^\circ$	112506.83	112281	226	
(^{4}F)	$z\,^4F_3^\circ$	113801.73	113852	−50	
(^{4}F)	$z\,^5G_4^\circ$	114886.14	114765	121	
(^{4}F)	$z\,^3D_3^\circ$	115736.24	115572	164	
(^{4}F)	$z\,^5F_5^\circ$	115738.07	115758	−20	
(^{4}F)	$z\,^3G_4^\circ$	116518.9	116436	83	
(^{4}F)	$z\,^5D_2^\circ$	116790.27	116681	109	
(^{4}F)	$z\,^5D_1^\circ$	117566.34	117640	−74	
(^{4}P)	$z\,^5P_1^\circ$	119227.56	119187	41	(^{4}P)^{5}P$_1^\circ$
(^{4}P)	$z\,^5P_2^\circ$	120042.76	120188	−145	(^{4}P)^{5}D$_2^\circ$
(^{4}P)	$z\,^5P_3^\circ$	120232.00	120183	39	(^{4}P)^{5}D$_4^\circ$
(^{2}G)	$z\,^3H_5^\circ$	120687.62	120776	−88	
(^{2}G)	$y\,^5F_4^\circ$	121161.42	121228	−67	
(^{4}P)	$y\,^5D_0^\circ$	121651.73	121662	−10	
(^{4}P)	$y\,^5D_1^\circ$	121733.85	121635	99	
(^{4}P)	$y\,^5D_2^\circ$	121899.35	121729	170	
(^{2}P)	$z\,^3P_0^\circ$	122741.65	123212	−470	
(^{2}G)	$z\,^3H_4^\circ$	122771.61	122931	−159	
(^{4}P)	$y\,^5D_3^\circ$	122992.91	123099	−106	(^{4}P)^{5}P$_2^\circ$
(^{2}P)	$z\,^3P_2^\circ$	123312.96	123673	−360	
(^{2}G)	$z\,^3H_3^\circ$	123329.95	123309	21	
(^{4}P)	$y\,^5D_4^\circ$	123503.32	123382	121	(^{4}P)^{5}P$_3^\circ$
(^{2}P)	$z\,^3S_1^\circ$	123778.95	123905	−126	(^{4}P)^{5}P$_1^\circ$

TABLE 3. Pd III *odd levels*—Continued

Configuration	Name	Observed	Calculated	Obs-Calc	Name (Shadmi)
(^{3}G)	$y\,^3F_4$	124236. 40	124133	103	
(^{3}G)	$z\,^1G_4$	124431. 47	124691	−260	
(^{3}P)	$y\,^3D_2$	124439. 49	124436	3	
(^{3}P)	$y\,^3D_3$	124643. 61	124628	16	
(^{3}H)	$y\,^1G_4$	124759. 94	124910	−150	
(^{3}P)	$y\,^3D_1$	124976. 06	125099	−123	
(^{3}H)	$z\,^3I_7$	125163. 08	125181	−18	
(^{3}G)	$x\,^3G_5$	125389. 89	125279	111	
(^{3}P)	$z\,^3P_1$	125477. 21	125396	81	(^{3}P)$^3S_1$
(^{3}G)	$z\,^3F_3$	125694. 00	125576	118	
(^{3}P)	$y\,^3P_0$	125893. 86	126028	−134	
(^{3}P)	$y\,^3P_2$	126078. 67	126261	−182	
(^{3}G)	$x\,^3G_4$	126913. 52	127037	−123	
(^{3}G)	$x\,^3G_3$	127017. 16	127145	−128	
(^{3}P)	$y\,^3P_1$	127149. 07	127224	−75	
(^{3}G)	$z\,^1H_5$	127187. 01	127179	8	
(^{3}G)	$y\,^3F_2$	127377. 9	127451	−73	
(^{3}H)	$z\,^3I_7$	127546. 1	127374	172	
($a\,^3$D)	$x\,^3D_3$	127657. 51	127728	−70	
(^{3}H)	$z\,^3I_6$	127906. 01	127830	76	
(^{3}H)	$y\,^3G_4$	127984. 23	127948	36	
(^{3}P)	$w\,^3D_3$	128037. 98	128127	−89	
(^{3}P)	$w\,^3D_2$	128212. 4	128047	165	(^{3}D)$^3F_2$
(^{3}P)	$w\,^3D_1$	128500. 19	128723	−223	(^{3}D)$^3D_1$
($a\,^3$D)	$x\,^3D_2$	128797. 57	128868	−70	
(^{3}H)	$y\,^3G_5$	129682. 29	129681	1	
($a\,^3$D)	$x\,^3D_1$	129841. 2	129840	1	(^{3}P)$^3D_1$
($a\,^3$D)	$x\,^3F_4$	130476. 14	130542	−66	
($a\,^3$D)	$x\,^3F_3$	130620. 71	130674	−53	(^{3}P)$^3D_2$
(^{3}H)	$z\,^1I_6$	130958. 84	130864	95	
(^{3}P)	$z\,^1S_0$	131482. 4	131512	−30	
(^{3}H)	$y\,^3H_4$	131550. 18	131693	−143	
($a\,^3$D)	$x\,^3F_2$	132043. 98	132031	+13	
(^{3}P)	$y\,^3S_1$	132180. 62	132653	−472	(^{3}P)$^3S_1$
(^{3}H)	$y\,^3H_5$	132300. 34	132373	−73	
(^{3}P)	$z\,^1P_1$	132715. 87	132975	−259	
($a\,^3$D)	$z\,^1D_2$	132742. 60	132576	167	($a\,^3$D)$^3P_2$
(^{3}P)	$y\,^1D_2$	132950. 75	133114	−163	
(^{3}H)	$y\,^3H_6$	133449. 96	133584	−134	
(^{3}H)	$y\,^1G_4$	134638. 1	134783	−145	
($a\,^3$D)	$z\,^3P_2$	135218. 90	134832	387	(^{3}D)$^1D_2$
($a\,^3$D)	$y\,^1F_3$	135355. 67	135412	−56	
($a\,^3$D)	$y\,^1P_1$	136782. 2	136949	−167	
(^{3}H)	$y\,^1H_5$	136846. 5	136908	−61	
(^{3}F)	$w\,^3F_3$	137160. 95	137515	−354	
($a\,^3$D)	$x\,^3P_1$	137489. 2	137415	74	
($a\,^3$D)	$x\,^3P_0$	137741. 1	137659	82	
(^{3}F)	$w\,^3G_3$	138414. 99	138499	−84	
(^{3}F)	$w\,^3G_4$	139048. 34	139188	−140	
(^{3}F)	$w\,^3F_1$	140472. 90	140631	−158	
(^{3}F)	$x\,^1D_2$	140561. 87	140820	−258	
(^{3}F)	$x\,^1G_4$	141018. 60	141168	−149	
(^{3}F)	$v\,^3D_3$	141282. 72	141116	167	
(^{3}F)	$w\,^3G_5$	141873. 9	141897	−23	
(^{3}F)	$w\,^3F_2$	141979. 44	142139	−160	
(^{3}F)	$v\,^3D_1$	142102. 6	141902	201	
(^{3}F)	$v\,^3D_2$	142218. 47	142091	127	
(^{3}F)	$x\,^1F_3$	146662. 4	146266	396	
($b\,^3$D)	$w\,^3P_2$	153928. 1	153766	162	
($b\,^3$D)	$v\,^3F_3$	154438. 47	154464	−26	
($b\,^3$D)	$w\,^3P_1$	154566. 9	154422	145	
($b\,^3$D)	$w\,^3P_0$	155388. 1	155229	159	
($b\,^3$D)	$v\,^3F_4$	156010. 7?	155840	171	
($b\,^3$D)	$^3F_2$		157947		
($b\,^3$D)	$^1F_3$		159169		
($b\,^3$D)	$^1P_1$		159336		
($b\,^3$D)	$w\,^3D_1$	161413. 3	161411	2	
($b\,^3$D)	$^3D_2$		161489		
($b\,^3$D)	$^1D_2$		162638		
($b\,^3$D)	$^3D_3$		163362		

TABLE 3. Pd III *odd levels*—Continued

Configuration	Name	Observed	Calculated	Obs-Calc	Name (Shadmi)
$4d^9(^2D)5s\ 5p$	$1\frac{1}{2}$	193222?			
$4d^9(^2D)5s\ 5p$	$2\frac{3}{2}$	195161?			
$4d^9(^2D)5s\ 5p$	$3\frac{1}{2}$	195444?			
$4d^9(^2D)5s\ 5p$	$4\frac{1}{2}$	197296?			
$4d^9(^2D)5s\ 5p$	$5\frac{3}{2}$	197939			
$4d^9(^2D)5s\ 5p$	$6\frac{1}{2}$	197959			
$4d^9(^2D)5s\ 5p$	$7\frac{1}{2}$	198107			

TABLE 4. *Observed terms of* Pd III

Configuration	Terms		
$4d^8$	$a\ ^3P\ a\ ^1D\ a\ ^3F\ a\ ^1G$		
	$nx=5s$	$nx=5p$	$nx=6s$ or $5d$
$4d^7(^4F)nx$	$a\ ^3F$ $b\ ^3F$	$z\ ^5D^\circ z\ ^5F^\circ z\ ^5G^\circ$ $z\ ^3D^\circ z\ ^3F^\circ z\ ^3G^\circ$	1 to 12 Inclusive.
(^4P)	$a\ ^3P$ $c\ ^3P$	$z\ ^3S^\circ z\ ^3P^\circ y\ ^3D^\circ$ $y\ ^3S^\circ y\ ^3P^\circ y\ ^3D^\circ$	
(^2G)	$a\ ^3G$ $b\ ^1G$	$y\ ^3F^\circ x\ ^3G^\circ x\ ^3H^\circ$ $z\ ^1F^\circ z\ ^1G^\circ z\ ^1H^\circ$	
(^2P)	$b\ ^3P$ $a\ ^1P$	$z\ ^3S^\circ z\ ^3P^\circ w\ ^3D^\circ$ $z\ ^1S^\circ z\ ^1P^\circ y\ ^1D^\circ$	
(^2H)	$a\ ^3H$ $a\ ^1H$	$y\ ^3G^\circ y\ ^3H^\circ z\ ^3I^\circ$ $y\ ^1G^\circ y\ ^1H^\circ z\ ^1I^\circ$	
$(a\ ^2D)$	$a\ ^3D$ $b\ ^1D$	$x\ ^3P^\circ x\ ^3D^\circ x\ ^3F^\circ$ $y\ ^1P^\circ z\ ^1D^\circ y\ ^1F^\circ$	
(^3F)	$c\ ^3F$ $a\ ^1F$	$v\ ^3D^\circ w\ ^3F^\circ w\ ^3G^\circ$ $x\ ^1D^\circ x\ ^1F^\circ x\ ^1G^\circ$	
$(b\ ^2D)$	$b\ ^3D$	$w\ ^3P^\circ w\ ^3D^\circ v\ ^3F^\circ$	
$4d^8\ 5s\ 5p$		1 to 7° Inclusive	

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