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The M Series Absorption Spectra of Osmium Iridium and Platinum

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THE M SERIES ABSORPTION SPECTRA OF OSMIUM, IRIDIUM AND PLATINUM

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(ABSTRACT)

Spectrograms have been obtained of all but three of the predicted M series absorption limits of osmium, iridium, and platinum.

A vacuum spectrograph of the Siegbahn type was used in this work. The slit of the spectrometer chamber was covered with a very thin celluloid film, smoked over a kerosene flame until sufficiently darkened to keep out the light of the incandescent filament. To make the film, celluloid was dissolved in amyl acetate and thinned until about like molasses. One small drop on the surface of water spread out forming a film two or three inches in diameter. After the amyl acetate had dissolved the film was lifted on a circular wire frame. After being dried, it was mounted over the slit with cement.

Gypsum crystals were used for the analysis. Imperial Eclipse photographic plates were used throughout.

Absorbing screens were made by dissolving soluble compounds of the metals investigated in ether and flexible collodion. The screen was placed midway between the slit and the crystal. The results obtained support the evidence reported by Zumstein [1] and Coster [2] that the M_1 and M_2 limits are of very much shorter wave length than predicted. The other limits are also slightly displaced toward shorter wave lengths. No evidence is found of an absorption limit slightly below but definitely separated from M_3 as reported by Zumstein [3] for tungsten.

The following tables show the results obtained thus far, together with the results of Zumstein, Coster, and Stenstrom.

RESULTS AND COMPARISONS

ELEMENT	LIMIT	λ (PREDICTED)	λ (OBSERVED)	DIFFERENCE	AUTHOR
W (74)	M_1	6.8809	6.708	—0.1719	Zumstein
Os (76)	M_1	6.33	6.194	—0.136	Rogers
Ir (77)	M_1	6.08	5.961	—0.119	Rogers
Pt (78)	M_1	5.8533	5.754	—0.1093	Rogers
Bi (83)	M_1	4.7897	4.762	—0.0277	Coster
Th (90)	M_1	3.7209	3.721	+0.0001	Stenstrom
Ur (92)	M_1	3.4910	3.491	0.0000	Stenstrom

1 Zumstein, Phys. Rev., Vol. 25, 1925, p. 747.
2 Coster, Phys. Rev., Vol. 19, 1922, p. 20.
3 Zumstein, Loc. Cit.

RESULTS AND COMPARISONS

ELEMENT	LIMIT	λ (PREDICTED)	λ (OBSERVED)	DIFFERENCE	AUTHOR
W (74)	M_2	6.6500	6.475	—0.175	Zumstein
Os (76)	M_2	6.08	5.975	—0.105	Rogers
Ir (77)	M_2	5.86	5.754	—0.106	Rogers
Pt (78)	M_2	5.6413	5.539	—0.1023	Rogers
Bi (83)	M_2	4.5886	4.569	—0.0196	Coster
Th (90)	M_2	3.5519	3.552	+0.0001	Stenstrom
Ur (92)	M_2	3.3258	3.3260	+0.0002	Stenstrom

RESULTS AND COMPARISONS

ELEMENT	LIMIT	λ (PREDICTED)	λ (OBSERVED)	DIFFERENCE	AUTHOR
W (74)	M_3	5.4664	5.418	—0.0484	Zumstein
Os (76)	M_3	5.06	5.027	—0.033	Rogers
Ir (77)	M_3	4.88	4.851	—0.029	Rogers
Pt (78)	M_3	4.6947	4.674	—0.0207	Rogers
Bi (83)	M_3	3.8942	3.894	—0.0002	Coster
Th (90)	M_3	3.0580	3.058	0.0000	Stenstrom
Ur (92)	M_3	2.8730	2.873	0.0000	Stenstrom

RESULTS AND COMPARISONS

ELEMENT	LIMIT	λ (PREDICTED)	λ (OBSERVED)	DIFFERENCE	AUTHOR
W (74)	M_4	4.8419	4.800	—0.0419	Zumstein
Os (76)	M_4	4.430	4.400	—0.030	Rogers
Ir (77)	M_4	4.260	....	.....	Rogers
Pt (78)	M_4	4.079	....	.....	Rogers
Bi (83)	M_4	3.3306	....	.....	Coster
Th (90)	M_4	2.5690	2.571	+0.002	Coster
Ur (92)	M_4	2.3923	2.385	—0.0073	Coster

RESULTS AND COMPARISONS

ELEMENT	LIMIT	λ (PREDICTED)	λ (OBSERVED)	DIFFERENCE	AUTHOR
W (74)	M_5	4.4051	4.365	—0.0401	Zumstein
Os (76)	M_5	4.07	4.0375	—0.0325	Rogers
Ir (77)	M_5	3.92	....	.....	Rogers
Pt (78)	M_5	3.756	3.738	—0.018	Rogers
Bi (83)	M_5	3.0919	....	.....	Coster
Th (90)	M_5	2.3886	2.388	—0.0006	Coster
Ur (92)	M_5	2.2313	2.228	—0.0033	Coster

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FURTHER EVIDENCE OF THE EFFECT OF VALENCE AND CHEMICAL COMBINATION ON THE K LIMIT OF SULPHUR

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(ABSTRACT)

A number of spectrograms have been obtained showing the K absorption limit of sulphur. The absorption was due to sulphur