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SPECTRAL LINES OF CURIUM FROM 3100 A TO 4200 A

John G. Conway and Milton F. Moore

April 7, 1948

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ABSTRACT

Fifty-four spectral lines of curium are listed together with estimated intensities. A brief description of the manner of taking the spectra and of measuring the lines is given.

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Experimental

Three separate samples of curium, in all seven micrograms, were submitted for spectrochemical analysis. The samples in acidic solution (HCl) were evaporated on copper electrodes and analyzed as outlined for the copper spark method[1,2]. An Applied Research Laboratories spark source was used.

The spectra were taken on a Baird Associates spectrograph of the modified Eagle type which has a dispersion of 5.6 A/mm in the first order. Spectrum Analysis #1 photographic plates were used and were processed according to the manufacturer's recommendations.

The plates were placed in the projection comparator (also an Applied Research Laboratories Unit) and the lines measured using the scale associated with the projection screen. The copper lines of the spectra were used as a wave length standard.

In all 54 lines which we feel can be attributed to curium were found. These, together with an estimated intensity based on an arbitrary 1 to 10 scale, are listed in Table I.

Due to the high alpha-activity of curium special care had to be exercised in handling the samples. In this case a pyrex bulb with quartz windows attached was made and all the sparking of curium was done in this container. An outlet from this bulb was connected through a glass wool filter system to a water aspirator. Upon completion of the work the bulb was flushed with nitric acid and then discarded. The acid wash and the glass wool were then returned for recovery of the curium.

Spectral Lines of Curium from 3100 A to 4200 A

Table I

Wave Length A	Intensity	Wave Length A	Intensity	Wave Length A	Intensity
3092.45	1	3546.13	5	3846.92	4
3105.83	1	3566.94	5	3860.9*	1
3145.80	1	3570.16	5	3909.3*	1
3196.51	1	3572.57	5	3936.72	2
3210.00	4	3580.79	3	3947.99	3
3220.79	6	3585.14	1	3948.79	1
3230.32	4	3591.41	1	3960.09	3
3238.36	2	3670.4*	1	3974.74	9
3252.69	4	3683.30	4	4003.33	8
3279.11	2	3692.32	4	4024.42	6
3296.18	4	3734.3*	1	4027.96	1
3304.8*	1	3738.18	1	4031.67	1
3367.90	1	3739.31	2	4061.6*	1
3374.7*	1	3740.7*	1	4078.95	3
3416.95	4	3749.76	2	4106.7*	1
3426.5*	1	3778.0*	1	4141.7*	1
3472.97	8	3779.6*	1	4208.94	9
3498.58	6	3840.49	3	4219.88	4

*All wave lengths good to 0.05 A except those marked with (*); these are good to 0.5 A.

References

1. Fred, M., N. H. Nachtrieb and F. S. Tomkins, J. Opt. Soc. Am., 37, 279 (1947).

2. Bachelder, M. C., J. G. Conway, N. H. Nachtrieb and B. S. Wildi, Atomic Energy Commission Declassified Document, MDDC 511, November 6, 1945.