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The Work Function of Lithium

Paul A. Anderson

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ABSTRACT

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ABSTRACT

Because they approximate their free electron models so closely, lithium and sodium are of exceptional importance in studies of the theory of the work function. For the purpose of supplementing theoretical calculations on these metals, a thorough experimental investigation of the work function of lithium has been carried out and the results, in combination with the calculations of Wigner and Bardeen, used to estimate the contribution of the surface double layer term to this work function.

As in previous studies of this series, the work function was determined by measurement of the contact difference of potential of lithium with respect to a barium reference surface of known work function. The measured surfaces of both lithium and barium were prepared by condensation of their vapors on glass targets after each of the metals had been subjected to fractional and multiple distillation in the measuring tube itself. The time interval between deposition and measurement of the films was of the order of 30 seconds. The observed contact difference of potential is 0.03 ± 0.02 ev, lithium electro-positive to barium. This result assigns the value 2.49 ± 0.02 ev to the work function of lithium. The effect of gaseous contaminants is to lower the work function.

The volume and surface double layer terms which determine the work function of lithium are of the order of 2.2 and 0.3 ev, respectively, a result which supports the conclusion that the surface double layer makes a relatively small contribution to the work functions of the alkali metals.

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