

**RESEARCH  
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Introduction

The contact potential difference  $V_{12}$  between two systems 1 and 2 is theoretically related to the corresponding difference of work functions  $\chi_2 - \chi_1$  by the simple equation<sup>1</sup>

$$eV_{12} = \chi_2 - \chi_1 \quad (1)$$

$e$  being the electronic charge. In this the work function is defined as the quantity  $\chi$  in the thermionic equation

$$i = A_0 D T^2 e^{-\chi/kT} \quad (2)$$

where  $i$  represents the electron emission at the absolute temperature  $T$  from unit area of emitting surface,  $A_0$  stands for  $4\pi me^3/h^2$

The Contact Potential Difference between Clean and Oxygenated Tungsten. 10 amp. cm<sup>-2</sup> deg.<sup>-2</sup>, and  $D$  is the mean transmission coefficient.

Tolerable good experimental verification of equation (1) has been obtained in a few cases where it has been tested, but in

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the case of clean tungsten and tungsten covered with a film of acetone. (Communication from the Research Staff of the M.O.Valve Company Limited at Wembley).

an approach to agreement between the experimental data obtained for  $eV_{12}$  and  $\chi_2 - \chi_1$ . It was in the hope of clearing up this situation that the experiments are to be described were undertaken. Incidentally some observations were made on the evaporation of oxygen (mixed in a small combination with tungsten or otherwise) from oxygenated tungsten.

Discussion of Earlier Experiments.

Data for the electron emission from oxygenated tungsten were obtained by Piggon<sup>2</sup> in 1924.

1. See, for example, J.A. Becker and F.H. Cottrell, *Phys. Rev.* 42, p. 94, 1931.

2. K.J. Kingdon, *Phys. Rev.* 24, p. 510, 1924.

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