

The effects of hydrogen sorption on the resistance and work-function of titanium films at 290K

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Abstract

Ti films readily sorbed hydrogen up to an atomic ratio $r=2.0$ at a saturation pressure of $2 \cdot 10^{-3}$ Torr. The turning points on the curve of resistance R versus r were correlated with the phase boundaries. The maximum on this curve agreed well with the data of Wedler and Strothenk (1966), and gave the solubility limit for H in Ti films at 290K as $H/Ti=0.07$. The data for the work-function ϕ agreed fairly well with Magee's (1968). The ϕ curve showed that the Fermi level μ of the FCC hydride was 0.14 eV higher than μ of the FCT phase, and at least 0.28 eV lower than μ for the clean metal. These data are compared briefly with the results of modern calculations on the band structure. The FCC/FCT phase boundary was at $r=1.8$ at 20 degrees C and r approximately=1.85 at 50 degrees C, and the FCC/FCT transition temperature was >50 degrees C.

Indexed keywords

Engineering controlled terms: FILMS - Electric Conductivity; TITANIUM AND ALLOYS - Thin Films

Engineering uncontrolled terms: WORK FUNCTION

Engineering main heading: HYDROGEN