

PRESSURE DEPENDENCE OF HIGH TEMPERATURE CREEP IN SINGLE
CRYSTALS OF INDIUM

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ABSTRACT

The activation volume for the high temperature steady-state creep of high purity single crystal indium in the pressure range of 0.8-5.5 kbars has been obtained using the change of slope method. The activation volume obtained is $12.0 \pm 0.9 \text{cm}^3/\text{mole}$ which corresponds to 0.76 atomic volume.

INTRODUCTION

At temperatures greater than one half of the melting point, creep in indium is a diffusion controlled process,¹ being limited by stress directed, non-conservative motion of the dislocations in the lattice. The high temperature creep rate over a relatively wide range of stresses can be expressed as²

$$\dot{\epsilon} = \frac{A a \sigma^{m+1} D}{G^m} \quad (1)$$

where $1 < m < 5$, A is a pressure independent constant, a is the lattice parameter, σ is the applied stress, and G is the