In cubic metals D_0 shows little variation with pressure and the magnitude of the second term on the right hand side of Eq. (4) is about 2-5 per cent of V_d.[3]

Experimentally measured values of V_d are generally smaller than the atomic volume, Ω, being of the order of 2/3 to 3/4 Ω in close packed lattices and 1/3 to 1/2 Ω in the more open metals. The only metal in which V_d has been found larger than Ω is aluminum where from creep studies[4] V_d equals 1.3 Ω. A theoretical basis for this result has been provided by the study of Blandin and Deplante[5] on the electronic structure of defects. Blandin and Deplante found that Friedel oscillations in the electronic density about a vacancy defect should cause the vacancy volume in the trivalent metal, aluminum, to be slightly larger than the atomic volume. In view of this result measurements of the activation volume in trivalent indium were made to ascertain whether large activation volumes are a general feature of trivalent metals.

EXPERIMENTAL PROCEDURE

Single crystal specimens were grown by Monocrystals, Inc., from 99.999% pure indium obtained from Cominco Products Inc. The crystals were in the form of 3/16 in. diameter rods with a gauge length of 1.25 in. and were randomly orientated. The ends of the crystals were beaded to facilitate gripping.