INTRODUCTION

The diffusion (interpenetration) of metals into lead was first reported by Roberts-Austen,[1] who measured the diffusion coefficients of Au into Pb. Since that time, the diffusion coefficients of a number of metals into lead have been measured and tabulated, including that for self-diffusion (see, for instance, Barrer).[2] Of the many systems studied, the two with the highest diffusion rates are Au in Pb[3] and Ag into Pb[4]--the former being the greater.

Although there has been a great deal of data taken for various systems at atmospheric pressure, there has been very little done to determine the effect of high pressures on diffusion. Self-diffusion in lead has been studied to 10 kb. by Nachtrieb and Rice,[5] and to 40 kb. by Hudson and Hoffman[6] with some disagreement in the interpretation of the results.

There have been several theories advanced relating to diffusion that either directly or indirectly involve a pressure dependence. The Dushman-Langmuir equation[7] is related to a pressure study through its ability to be tested against results for the same system at various pressures. Braune and Van Liempt[8] and Rice and Nachtrieb[9] have postulated linear relations between the melting point of the solvent and the activation energy of diffusion which may be compared against a known fusion curve.