Values of ΔV_a for pressures below 23 kilobars show a tendency to increase with increasing temperature (Table 2) varying from 8.058 cm^3/mole at 536°K, to 8.506 cm^3/mole at 769°K. Assuming that both pressure and temperature effects are real, it would appear that factors that tend to loosen the lattice (i.e., increasing temperature and decreasing pressure) increase ΔV.

3. Diffusion Mechanism

It has been generally supposed that silver diffuses through lead by an interstitial mechanism. The low activation energies and activation volumes, as well as the large diffusion constants obtained in this study, tend to support this supposition.

Stern and Eyring[25] calculated that the pressure required to reduce the diffusion constant by a faction of two for lead at 560°K would be of the order of 11 kb., assuming that the increase in volume required for an impurity jump resulted in an equivalent increase in the total volume of the system. On the other hand, if the increase in volume is absorbed by the surrounding lattice with no increase in the total volume of the system, the pressure required to reduce the diffusion constant for lead at 560°C by a factor of two is the order of 2.6 kb. Figure 11 of the present paper shows that at 555°C a pressure of 4 kilobars is required to reduce the diffusion constant by a factor of two. If we take Eyring's calculations at face value, the present study would indicate that most of the increase in volume is absorbed by the lattice, and a smaller part results in an increase in the total volume of the system.