

shear modulus.

The diffusion coefficient, D , is given by,

$$D = D_0 e^{-(Q_d + PV_d)/kT} \quad (2)$$

where Q_d and V_d are respectively the activation energy and activation volume for self diffusion, P is the hydrostatic pressure and D_0 is the pre-exponential frequency factor.

In a steady-state creep experiment the activation volume may be obtained by the change of slope method where the pressure is periodically cycled between two different pressure levels, P_1 and P_2 , while keeping the temperature and deviatoric stress constant, and the steady-state creep rates corresponding to P_1 and P_2 are measured. Using this method V_d is given by

$$V_d = - \frac{kT}{P_2 - P_1} \ln \frac{\dot{\epsilon}_2 G_2^m D_0^m a_1}{\dot{\epsilon}_1 G_1^m D_0^m a_2} \quad (3)$$

or

$$V_d = V_c - \frac{kT}{P_2 - P_1} \ln \frac{G_2^m D_0^m a_1}{G_1^m D_0^m a_2} \quad (4)$$

where

$$V_c = - \frac{kT}{P_2 - P_1} \ln \frac{\dot{\epsilon}_2}{\dot{\epsilon}_1} \quad (5)$$

is the apparent activation volume from creep measurements.