

Si diffusion in Fe at high pressure

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Diffusion is an ordinary mechanism occurring between all fundamental states of matter and it is influenced by the P/T conditions. The purpose of this study is to observe the pressure effect on diffusion coefficient of Si in pure Fe at constant temperature.

Multianvil apparatus (1000 tons press) was used for generating the P-T conditions required for studying the diffusion between the FeSi alloy (5 wt. % Si) and a pure iron. Three experiments were conducted at constant temperature of 1300°C and pressure of 5 GPa, 10 GPa and 15 GPa.

The diffusion profiles for the recovered samples in each experiment were measured by EPMA and resultant activation volume was 4.77 ± 0.08 cc/mol. To obtain precise pressure dependence of diffusion coefficient, further experiments should be conducted at higher pressures.

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