

Density and viscosity of the lunar basaltic magma at high pressure

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Physical properties of silicate melt is very important to understand the transport of magma in the planetary interior. In this study, we determined density and viscosity of lunar mare basalt magma at high pressure. The starting materials used for experiments were synthetic Apollo 14 black glass and Apollo 15 green glass-C. Apollo 14 black glass has the highest TiO₂ content, whereas Apollo 15 green glass-C has the highest Mg#, and is considered to be the most primitive magma ever found. The determined density of the green glass magma was 3.49g/cm³ at 14.5±0.5GPa, and 2773K. And the viscosity coefficients determined here were 0.64Pa s at 3.1GPa and 1913K for the green glass magma, 0.20Pa s at 2.3GPa and 1733K and 0.56Pa s at 3.5GPa and 1803K for the black glass magma.