

Density and viscosity of lunar basaltic magma under high pressure

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We measured the density and viscosity coefficient under high pressure for the lunar basaltic magma. The lunar basalt used in this study is Apollo 15 green glass-C that is considered to be the most primitive basaltic magma found on the moon. Density measurement was performed by the diamond flotation method. Consequently, densities of that basaltic magma are 3.50g/cm³ and 3.48g/cm³ at 12.0GPa, 2200C and 12.5GPa, 2500C, respectively. Then we decided that the bulk modulus is 17.9GPa and its pressure derivative is 6.5 for that magma, fitting by the third order Birch-Murnaghan equation of state to the derived density parameters. The viscosity measurement was performed by falling sphere method at 3.1GPa, 1640C, and we obtained viscosity coefficient, 0.64Pa s, for the lunar basaltic magma.