THE EFFECT OF CATION SPECIES ON THE SULFUR SOLUBILITY OF CaO-FeO-Al2O3-SiO2 MELTS

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The charge compensation effect of Ca2+ and Fe2+ on the sulfur solubility of CaO-FeO-Al2O3-SiO2 melts has been studied. The content of cation species (MO, M=Ca, Fe) and anion groups (AlO45-, SiO44-) were varied to determine the effect of charge compensation [1,2] on the sulfur solubility in high temperature ionic melts. The coordination number of aluminum ion in the super-cooled liquids was identified by deconvolution with PeakFitTM 4.0 of 27Al 500MHz Solid NMR Spectra. [3] The proportion of Qn was analyzed by Raman spectroscopy. [4]

As a result, the sulfide capacity represents a linear relationship according to the MO activity, as an index of the basicity. In the case of the cationic excess region (), the sulfide capacity is directly proportional to the basicity due to high S2- stabilization by excess cation. However, in the case of the cation deficient region (), the sulfide capacity was shown to be constant depending on the basicity.

Charge Balancing Join (1)

The reason is that S2- activity coefficient of the melts increase due to the absence of M2+ required for charge balancing with AlO45- and FeO45-. Also, the sulfur stabilization region was determined by the kind of the cation species (M2+). The charge balancing region is changed by the stabilization of Al3+ with Fe3+ [5] and influences on the cation substitution effect on the sulfur solubility.

\*Keywords: Sulfur solubility Charge Compensation, Iron Redox Equilibria, Cation Substitution, Aluminosilicate melts

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