Structure and properties of Zn-bearing in silicates glasses and melts

D. R. NEUVILLE

[1]IPGP-CNRS, Géochimie&Cosmochimie
1 rue Jussieu, 75005 Paris France
(* Correspondence : neuville@ipgp.fr)

Viscosity is a key parameter controlling the transport of silicate melts in a variety of processes relevant not only to igneous petrology and volcanology, but also to glassmaking and waste immobilisation. Zinc oxide is an important constituent of some industrial glasses but its influence on their physical properties is known poorly.

As a first step toward understanding this influence, we have measured the viscosity of a series of Zn-bearing silicate and borosilicate compositions above the liquidus and near the glass transition range. To complement available data, we have also determined the partial molar heat capacity of ZnO in melts through drop-calorimetry experiments on a few compositions. From these results, the configurational entropy of the melts could also been determined. Configurational entropy is an image of the glass structure and can be link at Q species determined from Raman spectrometry [1].

A salient feature of the results is the deep viscosity minimum observed near the glass transition when zinc is substituted for calcium. This minimum becomes less pronounced when the temperature increases, as previously observed when for Ca/Mg cations exchanged [2]. The thermodynamic and structural significance of these and other results will be discussed.

[1] Neuville D.R. and Mysen B.O (1996). *Geochimica Cosmochimica Acta*., **60**, 1727-1737. [2] Neuville D.R. and Richet P. (1991) *Geochim. Cosmochim. Acta*., **55**, 1011-1021.