

## Modelling viscosity of molten oxides (HotVeGas Part III)

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In the framework of the HotVeGas project, the structure based viscosity model recently developed for the fully liquid system  $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-CaO-MgO-Na}_2\text{O-K}_2\text{O-FeO}_x\text{-P}_2\text{O}_5$  is further improved. In terms of  $\text{FeO}_x$ -containing systems, a new associate species  $\text{Fe}_3\text{O}_4$  referring to the charge compensation of Fe and  $\text{Fe}^{2+}$  is introduced to describe the local viscosity maximum around the fayalite composition in the binary system  $\text{FeO}_x\text{-SiO}_2$ . The position and magnitude of the local viscosity maximum as a function of temperature, composition and oxygen partial pressure can then be properly predicted. Some larger structural units due to self- or inter-polymerization are employed to describe the viscosity behavior of the systems  $\text{FeO}_x\text{-SiO}_2$  and  $\text{FeO}_x\text{-Na}_2\text{O}$ . For  $\text{P}_2\text{O}_5$ -containing systems, two larger structural units due to self-polymerization of  $\text{P}_2\text{O}_5$  are used, which are analogous to the silica critical clusters for  $\text{SiO}_2$ -based systems. The corresponding model parameters are reassessed in conjunction with the structural features of the associate species. The extrapolated viscosities in the ranges where no experimental data are available in literature are then more reasonable. To achieve better model performance, more experimental data are required for both  $\text{FeO}_x$ - and  $\text{P}_2\text{O}_5$ -containing systems.