
CANCELED - Diffusion and Ionic Conduction in Glasses

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Abstract

In this contribution studies of ionic conduction and of radiotracer diffusion in oxide glasses are summarized. In contrast to ionic conduction tracer diffusion is element-specific. The tracer experiments comprise measurements of Na and Rb diffusion in single and mixed alkali borate glasses and of Na and Ca diffusion in soda-lime silicate glasses as function of temperature and of composition. Diffusivities and ionic conductivities are Arrhenius activated and are compared via the Nernst-Einstein relation. Haven ratios for both silicate and borate glasses are deduced. Viscosity diffusion coefficients are deduced from viscosity data for a soda-lime silicate glass via the Stokes-Einstein relation. Viscosity diffusion is considerably slower than diffusion of the network modifiers Na and Ca indicating that the motion of the network formers and network modifiers are decoupled. The ionic conductivity in soda-lime glasses is dominated by Na ions.

Keywords: diffusion, ionic conduction, borate glass, silicate glass

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