
In-situ Measurement of Reactions in a Glass-Forming Batch by Neutron Diffraction

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Abstract

The effects of batch particle sizes on reaction behavior were studied in a sodium aluminosilicate glass-forming batch using neutron diffraction. The phase reactions were measured in-situ during heating to 1500 °C. Diffraction data was collected using VULCAN, the Engineering Diffractometer at the Spallation Neutron Source at Oak Ridge National Laboratory. The batch reaction kinetics were represented well by an nth order reaction model. The measured batch reaction path was compared to one predicted by a new model using a pseudo-equilibrium approach.

Keywords: glass, batch, diffraction, reaction kinetics

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