transition with change of space group symmetry, and the systematic rearrangement of O-T-O bonds in the high-temperature phase. To our knowledge, this is the first direct experimental evidence of a zeolite framework disruption during dehydration caused by increased cation coordination to framework oxygens.


Cordierite glass ceramics are of considerable relevance to the electronics packaging industry due to their high dielectric constant and their low coefficient of thermal expansion. Interest has also been shown in their optical properties for use in tunable lasers and solar concentrators. They are presently being produced in bulk quantities for use as catalyst supports in catalytic converters for car exhaust systems.

Cordierite glass ceramics can be made by heating a glass of the appropriate stoichiometry (Mg2Al2Si5O18) above the glass transition temperature. An intermediate crystalline phase known as the cordierite is first formed as the final product, alpha cordierite, crystallizes. An intermediate crystalline phase known as the cordierite is first formed as the final product, alpha cordierite, crystallizes.

We have studied this reaction using time resolved powder diffraction, EXAFS and small angle scattering as well as conventional static measurements. The results of a detailed kinetic analysis will be presented together with a study of the effect of adding a number of nucleating agents to the reaction mixture.

An extension of the classical kinetic equations governing series reactions will also be presented.

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