

2020 Denver X-ray Conference
Invited talk during special session on Ceramics
August 3-7 2020, Rockville, Maryland

Title: High temperature x-ray diffraction for fundamental understanding of nucleation and growth of glass-ceramics.

Abstract:

The controlled crystallization of glass, leading to the discovery of glass-ceramics by Donald Stookey in the 1950's involved chance, combined with good observation skills and exploratory research. X-ray diffraction has played a key role in understanding the fundamentals of nucleation and crystallization of glass-ceramics over the last 60 years. This talk will discuss how high temperature x-ray diffraction is utilized to study the nucleation and growth events involved with glass-ceramic processing leading to fundamental understanding and improved properties. Specific examples in the lithium aluminosilicate, barium silicate and lithium zirconium phosphate silicate systems will be discussed. Since good calibration of any high temperature x-ray diffraction system is vital to providing reliable data, this talk will also discuss calibration of a high temperature x-ray diffraction system using a single, highly anisotropic, material.