

Abstract Submitted
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Extended X-ray Absorption Fine Structure (EXAFS) Analysis of Zirconium-Doped Lithium Silicate / Borate Glass-Ceramics¹

CHANGHYEON YOO, KANISHKA MARASINGHE, Department of Physics and Astrophysics, University of North Dakota, Grand Forks, ND 58202, CARLO SEGRE, Department of Physics & Center for Synchrotron Radiation Research and Instrumentation, Illinois Institute of Technology, Chicago, RICHARD K. BROW, Materials Science & Engineering, Missouri University of Science & Technology, Rolla, MO 65409 — Results of Zr K-edge Extended X-ray Absorption Fine Structure (EXAFS) spectroscopy analysis of a series of Zr-doped (~ 3 -10 mol% Zr and atomic ratio Li/Si ~ 0.8) lithium silicate glass ceramics (ZLS) and their parent glasses and a series of Zr-doped (~ 2 -6 mol% Zr and atomic ratio Li/B ~ 0.25 -0.18) lithium borate (ZLB) glasses are presented. Immediate coordination environment of all ZLS samples, i.e. the parent glasses and glass ceramics prepared via two different techniques, are remarkably similar. This observation suggests that zirconium ions may remain in the glass phase during nucleation and crystallization process. In contrast, immediate coordination environment of ZLB glasses appear to change markedly with the Zr concentration. These results also suggest that the structural role of Zr ions in ZLS and ZLB glasses may be significantly different. Details of analysis and results will be presented.

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Changhyeon Yoo
Univ of North Dakota

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