

Abstract Submitted
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Probing the role of Ga in amorphous conducting oxides through local structure studies¹ STEPHANIE MOFFITT, QIMIN ZHU, QING MA, DONALD BUCHHOLZ, ROBERT CHANG, THOMAS MASON, TOBIN MARKS, MICHAEL BEDZYK, Northwestern University — The study of amorphous (a-) conducting oxides is an emerging field. The lack of grain boundaries, smooth surfaces, and low temperature deposition position these materials as ideal candidates for large area applications and flexible electronics. Most impressively, these materials maintain high electron mobility in the amorphous state. These benefits have led the recent commercialization of a-IGZO (Ga and Zn doped indium oxide) as a replacement for a-Si as the channel layer of thin film transistors in display technology. Despite this success, fundamental understanding of structure-property relationships is still lacking and must be improved to guide further development of amorphous conducting oxides. X-ray absorption spectroscopy (XAS) is one of the few tools that can be used to probe the structure of amorphous materials. Amorphous indium oxide doped with Ga (a-IGO) is a model system to help develop the role of dopants in amorphous oxides. An in depth XAS study was carried out to determine inter-atomic distances, coordination numbers, and structural disorder parameters as a function of Ga doping level. The correlation between XAS-derived structural features and the dopant-dependent evolution of both electrical properties and thermal stability of a-IGO will be discussed.

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