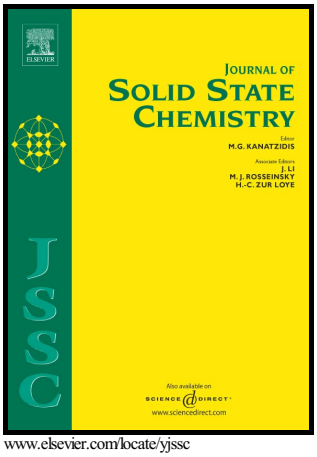

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PII: S0022-4596(17)30384-5
DOI: https://doi.org/10.1016/j.jssc.2017.09.028
Reference: YJSSC19958

To appear in: *Journal of Solid State Chemistry*

Received date: 11 August 2017
Revised date: 25 September 2017
Accepted date: 26 September 2017

Cite this article as: Sulgiye Park, Cameron L. Tracy, Fuxiang Zhang, Raul I. Palomares, Changyong Park, Christina Trautmann, Maik Lang, Wendy L. Mao and Rodney C. Ewing, Swift-heavy ion irradiation response and annealing behavior of A_2TiO_5 (A = Nd, Gd, and Yb), *Journal of Solid State Chemistry,* https://doi.org/10.1016/j.jssc.2017.09.028

Swift-heavy ion irradiation response and annealing behavior of A_2TiO_5 (A = Nd, Gd, and Yb)

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ABSTRACT

The structural responses of A_2BO_5 (A = Nd, Gd, and Yb; B = Ti) compositions irradiated by high-energy Au ions (2.2 GeV) were investigated using transmission electron microscopy, synchrotron X-ray diffraction and Raman spectroscopy. The extent of irradiation-induced amorphization depends on the size of the A-site cation, with smaller lanthanides having less susceptibility to the accumulation of radiation damage. In the track-overlapping regime, complete amorphization is observed in all three compounds, despite the ability of Yb_2TiO_5 to incorporate a great deal of structural disorder into its initial defect-fluorite structure (*Fm-3m*). This is attributed to the high cation radius ratio (A: B = 2:1), which reduces the stability of the structure upon ion irradiation. The fully-amorphized samples were subsequently isochronally