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Authors: Debasmita Dwibedi, Chinnasamy Murugesan, Michal Leskes, Prabeer Barpanda



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Role of Annealing Temperature on Cation Ordering in Hydrothermally Prepared Zinc Aluminate (ZnAl_2O_4) Spinel

Debasmita Dwivedi[†], Chinnasamy Murugesan[†], **Michal Leskes**[‡] and Prabeer Barpanda^{†,*}

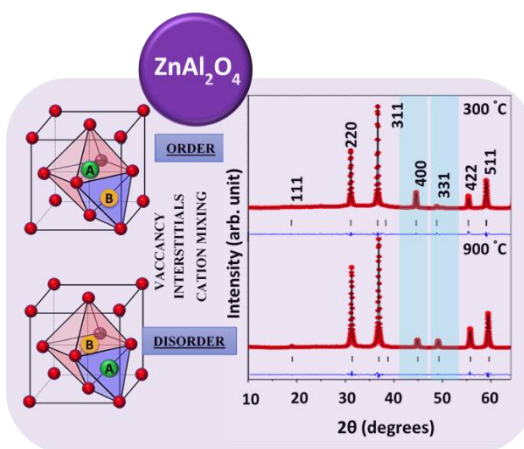
[†] Faraday Materials Laboratory, Materials Research Center, Indian Institute of Science, C.V. Raman Avenue, Bangalore 560012, India.

[‡] Department of Materials and Interfaces, Weizmann Institute of Science, Rehovot 76100, Israel.

*author for correspondence
E-mail: prabeer@mrc.iisc.ernet.in

Graphical Abstract

Zinc Aluminate Spinel/ ZAS (ZnAl_2O_4), a pivotal member of the oxide spinel group, is enriched with vacancy, interstitials and antisites. This versatility in structure provides room for defect induced fundamental studies. In this article, we have carried a detailed study of site flexibility exhibited by high temperature annealing of hydrothermally prepared ZnAl_2O_4 samples with the help of Rietveld analysis of X-ray diffractograms and local structure probing with Raman analysis.



Highlights

- Investigation of the structural anomaly in Zinc Aluminate Spinel/ ZAS (ZnAl_2O_4) by chemically inducing the defects by annealing temperature and synthetic pressure.
- Hydrothermal synthesis of ZnAl_2O_4 at 240° C from nitrate precursors.
- Study of the role of annealing temperature (300~900 °C) in tuning cation ordering.
- Rietveld analysis of powder X-ray diffraction patterns and Raman spectroscopy to showcase disorder-order transition in ZnAl_2O_4 spinels.

Abstract

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