

## **Morphology evolution in spinel manganite films deposited from an aqueous solution**

**Author(s):** S.W. Ko<sup>1</sup>; J. Li<sup>1</sup>; S. Trolier-McKinstry<sup>1,2</sup>

**Source:** THIN SOLID FILMS **Volume:** 522 **Pages:** 129-135 **DOI:** 10.1016/j.tsf.2012.08.047 **Published:** NOV 1 2012

**Conference:** EMRS Symposium Q on Engineering of Wide Bandgap Semiconductor Materials for Energy Saving Location: Nice, FRANCE Date: JUN, 2011

**Sponsor(s):** European Mat Res Soc (EMRS)

**Abstract:** Spinel manganite films were deposited by the spin spray technique at low deposition temperatures (<100 degrees C). It was found that the film microstructure depends strongly on the degree of supersaturation ( $S$ ) of the cations in the aqueous solution. For  $S < 2$ , well-crystallized isolated particles were deposited on the substrate, suggesting that heterogeneous nucleation with a low nucleation density dominates under these conditions. For  $10 < S < 200$ , the as-grown films were continuous, with some porosity confirmed by transmission electron microscopy (TEM); the films could be densified by post-deposition annealing at 400 degrees C for 1 h. As-deposited films under these conditions were X-ray amorphous but the nanocrystalline spinel phase was confirmed by TEM. In this region, both homogeneous and heterogeneous nucleation occur. For  $S > 1000$ , agglomeration of small particles was dominant, which suggests that homogeneous nucleation is dominant during deposition. Heterogeneous nucleation was critical to obtain dense films. (C) 2012 Elsevier B.V. All rights reserved.

### **Addresses:**

1. Penn State Univ, Mat Res Inst, University Pk, PA 16802 USA
  2. Penn State Univ, Dept Mat Sci & Engr, University Pk, PA 16802 USA
- E-mail Address: [ksw741@gmail.com](mailto:ksw741@gmail.com)

Publisher: ELSEVIER SCIENCE SA, PO BOX 564, 1001 LAUSANNE, SWITZERLAND