Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Novel Nanocomposites for Energy and Electromagnetic Applications via 3D self-assembly[1] AMIT GOYAL, SUNG-HUN WEE, YANFEI GAO, JUNSOO SHIN, KARREN MORE, YURI ZUEV, CLAUDIA CANTONI, JIANXIN ZHONG, MALCOLM STOCKS, Oak Ridge National Laboratory — Nanocomposites comprising ordered 3D arrays of nanodots of one type of ceramic material coherently embedded in another ceramic matrix comprise are expected to exhibit novel physical properties tunable by adjusting the overall composition, concentration, feature size and spatial ordering of the nanodots. Wide-ranging applications such as photovoltaics, solid state lighting, ultra-high density storage and high temperature superconductivity are of interest. We report here on a joint experimental, theoretical and computational study on achieving 3D ordering via 3D self-assembly of nanodots of a complex ceramic material within another complex ceramic material, such as 3D self-assembly of $BaZrO_3$ nanodots in REBCO superconducting films. Examples will also be given for other ceramic and metal/ceramic systems. In all cases 3D self-assembly was obtained in epitaxial thick films grown via pulsed laser ablation on single-crystal or single-crystal-like substrates.

[1]Research was sponsored by the U.S. Department of Energy under contract DE-AC05-00OR22725 and by an internal Laboratory Directed Research & Development (LDRD) project.

Amit Goyal
Oak Ridge National Laboratory

Date submitted: 03 Dec 2007 Electronic form version 1.4