Search for Superconductivity in Manganese Copper Oxides

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AFOSR MURI "SEARCH FOR NEW SUPERCONDUCTORS FOR ENERGY AND POWER APPLICATIONS"

1 Introduction:

Searching for Superconductivity by supression of AFM near instabilities in multiferroic oxides

Cuprates
(1-unpaired e)
single-orbital
low-moment
Mott-system,
high Tc

Manganites
multi-orbital
high-moment
no Tc

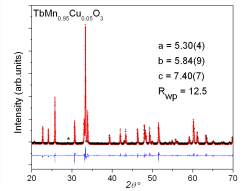
Pnictides
multi-orbital
low-moment
metals
moderate Tc

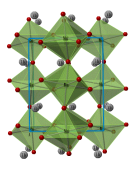
- Multi-orbital
- Mott system
- low-moment

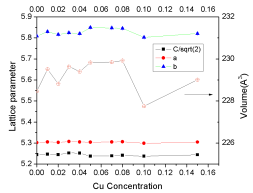
Combine ???

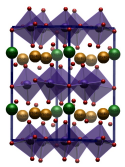
Reduced Dimensionality
Transition metal & other large U ions
Light atoms
Tunability
Charged and multivalent ions
Competing orders / phase instabilities

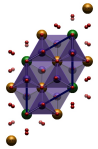
2 XRD, Crystal structure



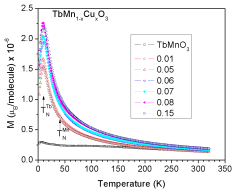


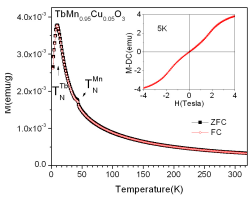


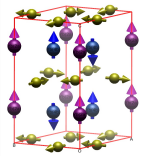


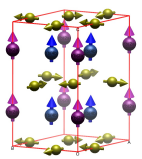


3 Magnetism

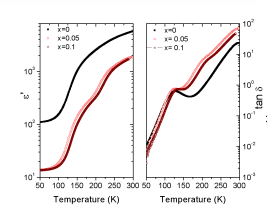


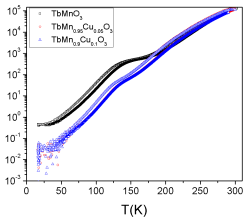




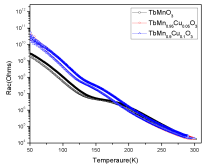


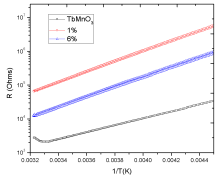
4 Dielectric Properties

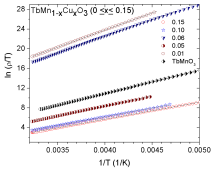


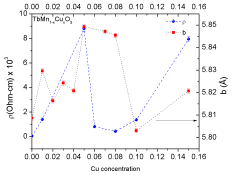


5 DC/AC Resistivity









6 Conclusions:

We have found instabilities in the dielectric constant and other changes in resistivityof Cu-substituted multiferroic maganite oxides.

Resistivity and susceptibility studies do not show superconductivity so far.

We plan to continue searching in similar systems.