

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Structures and properties of $\text{Ni}^{1+/2+}$ nickelates with infinite NiO_2 layers KONSTANTIN LOKSHIN, TAKESHI EGAMI, University of Tennessee, VIKTOR POLTAVETS, MARTHA GREENBLATT, Rutgers University — Layered mixed valence $\text{Ni}^{1+/2+}$ nickelates possess similar crystal and electronic structures to $\text{Cu}^{2+/3+}$ high temperature superconducting cuprates. Only a few $\text{Ni}^{1+/2+}$ nickelates have been identified and their properties have not been reported so far. We present a first systematic study of $\text{Ln}_{n+1}\text{Ni}_n\text{O}_{2n+2}$, $\text{Ln} = \text{La}$ or Nd , which structures could be described as an intergrowth of $\{\text{LnO}_2\}$ fluorite and infinite layer $\{\text{LaNiO}_2\}_n$ blocks. The crystal structures of the new $\text{Ln}_3\text{Ni}_2\text{O}_6$, $\text{Ln}_4\text{Ni}_3\text{O}_8$, $\text{Ln}_5\text{Ni}_4\text{O}_{10}$ phases have been confirmed by X-ray and neutron powder diffraction. X-ray absorption spectroscopy data proves the $1+/2+$ oxidation state and planar coordination of Ni atoms. Magnetic susceptibility data of $\text{Ln}_{n+1}\text{Ni}_n\text{O}_{2n+2}$ will be discussed.

Konstantin Lokshin
University of Tennessee

Date submitted: 01 Dec 2006

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