Previous abstract | Graphical version | Text version | Next abstract

Session G21 - Structural Phase Transition.
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[G21.008] Magnetostructural Properties of Colossal Magnetoresistance Manganites Under External Magnetic Fields and Uniaxial Pressure

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In the colossal magnetoresistance manganites the transport and magnetostructural properties are tightly connected [1,2]. Many magnetic field induced structural phase transitions and anomalous magnetoacoustical properties continue to be discovered in various manganite derivatives. Nevertheless the mechanism of structural transitions and microscopic theory of corresponding anomalous properties are still to be completely understood. Here we present a microscopic model of magnetic field and uniaxial pressure induced structural phase transitions in lightly doped manganites. The model is based on the cooperative Jahn-Teller effect which takes into account the Mn3+-ground doublet and excited triplet electronic states. Numerous calculations for different orientation magnetic field suggest the explanations of the origin of the structural transitions and of the measured magnetostriction data. The calculations for the two-sublattice antiferrodistortive crystals under uniaxial pressure support the idea of metaelasticity - a property typical for Jahn-Teller antiferroelastics.

1.Y. Tokura, ed. Colossal Magnetoresistance Oxides. Gordon amp; Breach, London, 2000. 2.M. Kaplan, G. Zimmerman, eds. Vibronic Interactions: Jahn-Teller Effect in Crystal and Molecules. NATO Science Series, Dordrecht/Boston/London, 2001

■ Part G of program listing