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Charge ordering structure and Mn valence in La0.33Ca0.67MnO3
JING TAO, EMMANUAL AUBERT, Department of Material Science and , JIAN-MIN (JIM) ZUO, Department of Material Science and Engineering, MRL, University of Illinois at Urbana-Champaign — Charge ordering (CO) and its structure is one of the long standing questions about manganites. Previously, X-ray, neutron and electron diffraction had been used to explore the crystallographic structure in charge ordered La1-xCaxMnO3 [2-3]. Two possible models, "Wigner-crystal" model and "Bi-stripe" model of the CO structure were proposed and supported by different evidences. Convergent beam electron diffraction (CBED) has unique capability on crystallographic symmetry determination and for probing crystal charge density [1]. The CBED patterns are sensitive to the charge states of atoms. The experimental CBED patterns show clearly the symmetry against the "Bi-stripe" model. The experimental CBED patterns are further compared with simulation using different charge valence models. The results show a surprisingly small difference between Mn(3+) and Mn(4+). The significance of this work will be discussed. Reference: [1] J. M. Zuo, Rep. Prog. Phys, 67, 2053 (2004) [2] P. G. Radaelli et al., Phys. Rev. B 55, 3015 (1997) [3] S. Mori, C. H. Chen, and S.-W. Cheong, Nature 392, 473 (1998)

Jing Tao
Department of Material Science and Engineering, University of Illinois at Urbana-Champaign

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