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# Alteration of magnetic behavior and microstructural distortion of $EuMnO_3$ by partial substitution of Eu with monovalent Na

Anshuman Nandy[a], Tanusree Kar[b], Satya Ranjan Bhattacharyya[c], Dipankar Das[d], Swapan Kumar Pradhan[a,*]

[a]*Materials Science Division, Dept. of Physics, The University of Burdwan, W.B, India*

[b]*Indian Association for Cultivation of Science, Kolkata- 700032, W.B., India*

[c]*Saha Institute of Nuclear Physics,1/AF Bidhannagar, Kolkata-700064, W.B., India*

[d]*UGC-DAE Consortium for Scientific Research, III/LB-8, Bidhannagar, Kolkata -700098, India*

**corresponding author e-mail: skp_bu@yahoo.com*

## Abstract

Effect of monovalent sodium doping on inherent lattice distortion and magnetic properties of $EuMnO_3$ is reported in this work. Perovskite structured $Eu_{1-x}Na_xMnO_3$ (x=0.0, 0.1, 0.2) compounds are prepared by conventional sol-gel method. Inherent structural distortion of $EuMnO_3$ and its modification by Na doping is investigated by analyzing powder X-ray diffraction patterns of these compounds. Numerical values of different structural and microstructural parameters related to structural distortion are evaluated by Rietveld analysis of XRD patterns. Different distortions in $MnO_6$ octahedra are shown by 3D atomic models. The value of Goldschimdt tolerance factor is calculated as 0.8711 for the undoped compound and 0.8870 and 0.8856 for the 10mol% and 20mol% Na doped compounds respectively. Na doping stabilizes the orthorhombic perovskite structure and reduces both octahedral and Jahn-Teller