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**Charge and orbital order effects in $\mathbf{La}_x\mathbf{Sr}_{1-x}\mathbf{MnO}_{2.6}$** B. DABROWSKI, Physics Department, Northern Illinois University, DeKalb, IL 60115, Materials Science Division, Argonne National Laboratory, Argonne, IL 60439, L. SUESCUN, Facultad de Química, Universidad de la República, Montevideo, Uruguay, S. KOLESNIK, S. REMSEN, J. MAIS, Physics Department, Northern Illinois University, DeKalb, IL 60115 — Low temperature annealing in hydrogen have been used to obtain oxygen vacancy ordered manganites $Sr_{4+n}Mn_4^{3+}Mn_n^{4+}O_{10+3n}$ (n=0, 1, 3) displaying charge and orbital ordering. For the La-substituted n=1 phase four $Mn^{3+}$ cations exhibit elongated pyramidal coordination while the fifth one in octahedral coordination shows decreasing formal valence $Mn^{(4-5x)+}$. This selective doping produces structural strain resulting in unusual apically compressed coordination leading to complex magnetic interactions and frustration. Similar structures have been previously observed for the (La,Ba)$CuO_{3-d}$ cuprates revealing common vacancy ordering relationships in perovskites for which highly distorted $Mn^{3+}$ ($Cu^{2+}$) and symmetric $Mn^{4+}$ ($Cu^{3+}$) ions are present simultaneously. Work at NIU was supported by the NSF-DMR-0706610 and at ANL by the U.S. DOE under contract No. DE-AC02-06CH11357.

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