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Structural and magnetic properties of ferromagnetic metal-oxide films grown by polymer assisted deposition M. JAIN, P. SHUKLA, M. F. HUNDLEY, A. K. BURRELL, T. M. MCCLESKEY, Q. X. JIA, Los Alamos National Lab — Ferromagnetic metal-oxide films such as doped lanthanum manganites have been extensively investigated over the past decade due to their potential applications in different fields. To grow these oxide films, the most widely used approaches are physical vapor deposition, chemical vapor deposition, and chemical solution deposition techniques. One of the challenges in solution-based processes of such oxide films has been to produce high quality multilayer films and at the same time to control the stoichiometry. We describe a solution route called polymer-assisted deposition (PAD) to grow such oxide films. High quality epitaxial single layer and multilayer coated films of $La_{0.67}Sr_{0.33}MnO_3$ (LSMO) and $La_{0.67}Ca_{0.33}MnO_3$ (LCMO) have been grown by PAD. Multilayer is used to effectively take the advantages of both LSMO and LCMO with an aim to achieve large values of magnetoresistance (MR) near room temperature. An MR value as high as -66% at 5 T has been obtained at 295K for the multilayer-coated films with LSMO/LCMO volume ratio of 60/40. The successful growth of epitaxial doped lanthanum manganites with desired properties by PAD shows that PAD is a feasible alternative approach to the growth of high quality metal-oxide films.

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