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**Epitaxial growth of complex oxide films by a chemical solution method** Q.X. JIA, M. JAIN, H. LUO, E. BAUER, Los Alamos National Lab, H. WANG, Texas A&M University, A.K. BURRELL, T.M. MCCLESKEY, Los Alamos National Lab — In the last several years, complex oxides have become the basis for many revolutionary electronic devices because they exhibit a wide range of electronic properties that conventional metallic elements and covalent semiconductors do not possess. Complex oxide films can be grown by physical vapor deposition, chemical vapor deposition, and chemical solution deposition techniques. One of the challenges in solution-based processes of oxide films has been to produce high quality films and at the same time to control the stoichiometry. Here we describe a new chemical solution method called polymer-assisted deposition (PAD) to grow epitaxial oxide films (such as $Ba_{1-x}Sr_xTiO_3$ and $La_{0.7}Sr_{0.3}MnO_3$). We use a new strategy to control the distribution of metals in solution at a molecular level and a mixture of metal precursor and soluble polymer to form a solution with desired viscosity. By actively binding the metal, the polymer serves to encapsulate the metal to prevent chemical reaction while maintaining a uniform distribution of the metal in solution. This ensures a homogeneous metal distribution and prevents unwanted reactivity that can lead to the formation of undesired phases. The successful growth of epitaxial complex oxide films by PAD suggests that PAD is a feasible alternative approach to the growth of high quality films with desired properties.

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