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Epitaxial thin films of novel multiferroic double perovskites. A. VENIMADHAV, QI LI, Department of Physics, Pennsylvania State University, PA16801 — Recently multiferroic materials have attracted great interest. However, relatively a few pure multiferroic compounds are currently known. Here we show the exploration of design of multiferroic properties in double perovskites by combining the ferrolectrisity driven by the Bi lone pairs and selectively choosing the 3d transition metals following Goodenough-Kanamori's rules to bring in ferromagnetism. We present growth issues in stabilizing the single phase, epitaxial thin films of new double perovskite multiferroic systems such as Bi_2NiMnO_6, $Bi_2FeCrO_6$and $La_2NiMnO_6$by pulsed laser deposition. Targets of these compositions were synthesized by solid state method with 15% of excess Bi in the composition to compensate the volatility of Bi during the deposition. We also present the synthesis of $Bi_2FeCrO_6$by growing a superlattice structures from individual targets of Bi FeO_3 and $BiCrO_3$. In the cubic double perovskites, cations show rock salt kind of ordering in the (111) direction and hence growing these films on STO (111) substrates has an advantage. We present the growth, structural and multiferroic properties in these double perovskite thin films..

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