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Room-Temperature Multiferroic Properties of Bismuth Manganite Thin Film W.C. KUO, C.Y. KUO, H.J. LIU, H.J. LIN, Y.H. CHU, Y.C. CHEN, T.M. UEN, J.Y. JUANG — In multiferroic materials, low temperature multiferroic properties in perovskite type BiMnO_3 has been demonstrated. In this work, through epitaxial strains exerted by LaAlO_3 single crystal substrate, we successfully demonstrate the growth the c-axis oriented new phase in BMO thin film. After the deposition, HRXRD has been used to characterize the lattice structure, which show new fascinating phase that are different from the papers early reported. We further revealed manganese valence through the X-ray Magnetic Linear Dichroism measurement and exhibit the mixed +3 and +4 valence of manganese. With LaNiO_3 bottom electrode, room-temperature ferroelectricity is demonstrated by piezoelectric force microscopy, which revealed the reversible ferroelastic switching through the external electrical bias. M-H curves are measured by SQUID magnetometer as a function of temperatures. Ferromagnetic behaviors have been probed from room temperature (300K) to low temperature (10K), furthermore, ferromagnetic phenomenon has been observed at 300K. In our preliminary results, room temperature ferroelectric and ferromagnetic properties could be coexistent in single phase material through epitaxial strain, thus provide a modeling system to study the multiferroic material and a powerful candidate for the next- generation electronic devices.

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