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Antiferromagnetic phase in ultrathin La2/3Sr1/3MnO3 films probed by exchange bias effect YUJUN SHI, DI WU, Physics Departmen, Nanjing University — Understanding the magnetic and electronic properties of the interfaces between two different perovskite oxides has gained significant attention in recent years. An important case is the interface between manganite La2/3Sr1/3MnO3 (LSMO) and SrTiO3 (STO). Grown on STO, ultrathin LSMO acts as a ?dead layer? with strongly depressed magnetization and insulating properties below a critical thickness. Since the electronic and magnetic properties of the interfaces between two oxides are sensitive to epitaxial strain, chemical stoichiometry, and polarity discontinuity, the magnetic state of LSMO dead layer is still not well understood. Here we utilize the exchange bias (EB) effect, which generally occurred in the FM/AFM bilayers. We deposited a very thin layer of Co on ultrathin LSMO films epitaxially grown on STO(001) substrates. We observed strong EB effects and coercivity enhancement for LSMO thicknesses below 3 unit cells (u.c.). The observed effects reveal the presence of AFM phase in ultrathin LSMO. The EB effect rapidly disappears with increasing temperature. Furthermore, the observation of EB down to one u.c. LSMO demonstrates the C-type AFM ordering structure other than A-type. The EB provides an easy way to study the magnetic states of ultrathin oxide films.

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