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Electron transport properties of Cadmium Oxide thin films grown by molecular beam epitaxy YU YUN, SONGSHENG TAO, YANG MA, WENYU XING, YANGYANG CHEN, TANG SU, QI SONG, WEI YUAN, XI LIN, X. C. XIE, WEI HAN, International Center for Quantum Materials, Peking University — Oxide electronics has drawn significant attention because of its potential application in future electronic and optical devices. In this study, we have fabricated high quality CdO and La-doped CdO thin films on MgO substrates by oxide molecular beam epitaxy. The crystal structure is characterized by X-ray diffraction, and the electron mobility is studied using van der Pauw method. We have found that the electron mobility is dominated by the ionized impurity scattering below 50 K, and longitudinal optical phonon scattering dominates from 50 to 300 K with a longitudinal optical phonon energy of about 41 eV. The electron mobility first increases with the La doping, reaching the maximum value of electron mobility at 2 K of around 520 cm2V-1s-1 at carrier density about 1.4x1020 cm-3, and then falls as the doping increases.

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