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Optical and magnetic properties of Ca_3CoMnO_6 thin films[1] JITENDRA SAHA, GYANESHWAR SHARMA, Graduate Student, SATYABRATA PATNAIK, Associate Professor, S PATNAIK TEAM — Ca_3CoMnO_6 is one of the initial one-dimensional Ising chain compounds that has shown large magnetoelectric coupling below its antiferromagnetic temperature (15 K). We report on the growth and characterization of Ca_3CoMnO_6 thin films deposited by pulse laser deposition. The films of thickness 220 nm are grown on 0001-oriented sapphire substrates at 750 °C. The band gap ($\sim$ 1.73eV) derived from UV visible absorption spectroscopy and temperature dependent resistivity is consistent with one another. It is seen that the films can be grown at various oxygen pressures but the optimal deposition pressure is found to be $5x10^{-2}$ mbar. The effect of oxygen pressure on the texture of the film and band gap indicates that the oxygen vacancies play a major role in the optical and electrical properties of the films. AFM measurements show a homogeneous growth of the films. Magnetization measurement shows that the transition temperature increased to 39 K, much above the bulk Neel temperature. The increase in magnetic transition is supposed to be due to stronger inter-chain interaction caused by tensile strain effected by lattice mismatch.

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