

Characterization of CoCr_2O_4 on Pt(111) Grown by Using Pulsed Laser Deposition

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CoCr_2O_4 (CCO) materials show multiferroic effect that ferroelectricity and ferromagnetism co-exist. CCO film was deposited on Pt/Ti/Si/SiO₂ substrates by pulsed laser deposition (PLD). The CCO film were prepared using KrF(248 nm) excimer lasers and with a pressure of 100 mTorr, substrate temperatures of 700°C. The crystal structure was found to be oriented {111} planes by means of X-ray diffraction (XRD) with Cu radiation. The morphology of film has showed triangle shapes. The ferrimagnetic transition was observed at around 95 K, which was determined as Néel temperature and spiral magnetic transition temperature (T_S) was 21.5 K, while the T_S of bulk CCO was 28.0 K. We note that decreasing of T_S in CCO films is closely related to the preferred orientation of {111} direction.

Index Terms—Multiferroic, pulsed laser deposition, spiral magnetic transition.