

Preparation of LaAlO₃ Thin Films by Sol-gel Method

Hye-Jin Kim, Byeong-Joo Kim, Hee-Gyoun Lee and Gye-Won Hong*

Department of Advanced Materials Engineering, Korea Polytechnic University, Korea

Lanthanum aluminate(LaAlO₃) film was prepared on metal and single crystal substrates by a dip coating method. Lanthanum acetate and aluminum acetate glacial acetic acid solution were prepared via ligand exchange starting from lanthanum nitrate hexahydrate and aluminum nitrate hexahydrate after being refluxed. Coating solution was obtained by diluting the gel with methanol for adjusting the total cation concentration to 2 M. Precursor coated film was prepared by dip-coating with a speed of 25mm/min on various substrates such as LaAlO₃(001), MgO(001), SrTiO₃(001) single crystal, LMO/MgO/Ni-alloy and CeO₂/LMO/MgO/Ni-alloy . LaAlO₃ thin film have been obtained by heat treating the precursor film at various heat temperatures from 900 °C~1100 °C and various heating rate from 7.5 °C/min ~ 9.16 °C/min under Ar (1000 sccm) atmosphere. The films are characterized by scanning electronic microscopy (SEM) and X-ray diffraction (XRD). XRD analysis for the prepared film showed that LaAlO₃ thin films with a preferred orientation were obtained at 900 °C(7.5 °C/min) on LMO/MgO/Ni-alloy substrate, but the amount of secondary phase was increased and the intensity was decreased with the increase of heat treatment temperature. The effects of various processing parameters on the texture development of LaAlO₃ thin film will be presented.

Key word: sol-gel method, preferred orientation, LaAlO₃

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