Temperature dependence of CuGaO 2 films fabricated by sol-gel method Abstract

P-type CuGaO₂ films have been fabricated on silicon substrates by the sol-gel method. The stable sol solutions for CuGaO₂ growth were developed by the mixing of Cu-O and Ga-O sol solutions using copper(II) acetate monohydrate and tris(acetylacetonato) gallium(III), respectively. Phase separation in CuGaO₂ films depends on the sol solution temperature and postbake temperature and duration. CuGaO₂ films without a CuO phase were fabricated by postbaking at temperatures of approximately 800 °C for 1 h in N₂ atmosphere. The sol-gel-derived CuGaO₂ films show high transparency of more than 80% in the visible range, and the energy gap is approximately 3.6 eV.