Characteristics of IGZO TFT Prepared by Atmospheric Pressure Plasma Jet Using PE-ALD Al2O3 Gate Dielectric

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Abstract

This letter proposes a novel atmospheric pressure plasma jet (APPJ) method for indium–gallium–zinc-oxide (IGZO) deposition and use of the plasma-enhanced atomic layer deposition (PE-ALD) Al2O3 as gate dielectric. A nonvacuum and simple APPJ system was demonstrated for channel material deposition. High-transmittance nanocrystalline IGZO thin films were obtained. Excellent electrical characteristics were achieved, including a low VT of 0.71 V, a small subthreshold swing of 276 mV/dec, a mobility of 8.39 cm2/(V · s), and a large Ion/Ioff ratio of 1 × 108.

Keyword：Al2O3, atmospheric pressure plasma jet (APPJ), indium–gallium–zinc oxide (IGZO), nonvacuum, plasmaenhanced atomic layer deposition (PE-ALD).