

## Sputtering of Multifunctional AlN Passivation Layer for Thermal Inkjet Printhead

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The aluminum nitride films were prepared by RF magnetron sputtering using an AlN ceramic target. The crystallinity, grain size, Al-N bonding and thermal conductivity were investigated in dependence on the plasma power densities (4.93, 7.40, 9.87 W/cm<sup>2</sup>) during sputtering.

High thermal conductivity is important properties of AlN passivation layer for functioning properly in thermal inkjet printhead. The crystallinity, grain size, Al-N bonding formation and chemical composition were observed using X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), fourier transform infrared (FTIR) and X-ray photoelectron spectroscopy (XPS), respectively. The AlN thin film was changed from amorphous to crystalline as the power density was increased, and the largest grain size appeared at medium power density. The near stoichiometry Al-N bonding ratio was acquired at medium power density. So, we know that the AlN thin film had better thermal conductivity with crystalline phase and near stoichiometry Al-N bonding ratio at 7.40 W/cm<sup>2</sup> power density.

**Keywords:** AlN, thermal conductivity, Sputtering, inkjet printhead, passivation layer