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MOCVD Deposition of AlN Thin Film for Packaging Materials

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패키징응용 AlN박막의 MOCVD증착

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New single-source precursor, [AlCl3:NH2tBu] was synthesized for AlN thin film processing with AlCl3 (Aluminum Chloride) and tBuNH2 (tert-butylamine). AlN thin films for packaging aspplication were deposited on sapphire substrate by atmospheric-pressure MOCVD. In most of other study methyl-based Al precursors were used for source, But herein Aluminum Chloride was used for as Al source in order to prevent the carbon contamination in the films and stabilize the precursor.

New precursor showed the very high gas vapor pressure so it allowed to make the film under atmospheric-pressure and get the high purified film. High quality AlN thin film was obtained at 700 to 900℃. The new precursor was purified by a sublimation technique and help to fabricate high purity film. It showed high vapor pressure, which is able to a critical factor for the high purity and atmospheric CVD of AlN. High quality AlN thin film was obtained at 700-90 0℃. The AlN film was characterized by RBS(Rutherford Backscattering Spectroscopy), AES(Auger Electron Spectroscopy), and XPS(X-Ray Photoelectron Spectroscopy). The AES depth profile analysis gave excellent AlN ratio with negligible amounts of carbon and oxygen. The residual oxygen was less than 1 atomic %, and carbon was not detected in the AES resolution. The AlN films showed preferential c-axis orientation and dense packing structure. The single-source precursor MOCVD at atmospheric pressure is a high potential processing for packaging application.