

Thin film encapsulation technology for hybrid inorganic-organic multilayer structures of flexible OLEDs

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ALD/PECVD are applied as the hybrid multilayer, which has property for the moisture barrier for the thin film encapsulation of flexible OLEDs. Plastic substrate was used for the substrate, n-hexane, furan, HMDSO as the organic layers, Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub> and nanolaminate structure as inorganic layers. we used the PEN film as the plastic substrate. The inorganic layers thin films were deposited on the substrates by using TMA(Tri-Methyl Aluminum), TEMAZ(Tetra ethylmethyl amino zirconum) with H<sub>2</sub>O as inorganic precursors and Ar gas was used as a purging gas. The TMA, TEMAZ and water were vaporized at 5°C, 60°C and room temperature for delivering to the deposition chamber. The inorganic layer thin film was grown at temperatures of 80°C under a pressure of 300mtorr. The organic layer was deposited by plasma-CVD method and room temperature, respectively. The samples were analyzed for their thickness, water contact angle, surface roughness, bending properties and WVTR. The WVTR was measured in a constant temperature & humidification chamber, To measure WVTR, we set the condition of the temperature 85°C and relative humidity 85%.