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## Fabrication of Hybrid Films Using Titanium Chloride and 2,4-hexadiyne-1,6-diol by Molecular Layer Deposition

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We fabricated a new type of hybrid film using molecular layer deposition (MLD). The MLD is a gas phase process analogous to atomic layer deposition (ALD) and also relies on a saturated surface reaction sequentially which results in the formation of a monolayer in each sequence. In the MLD process, polydiacetylene (PDA) layers were grown by repeated sequential surface reactions of titanium tetrachloride and 2,4-hexadiyne-1,6-diol with ultraviolet (UV) polymerization under a substrate temperature of 100°C. Ellipsometry analysis showed a self-limiting surface reaction process and linear growth of the hybrid films. Polymerization of the hybrid films was confirmed by infrared (IR) spectroscopy and UV-Vis spectroscopy. Composition of the films was confirmed by IR spectroscopy and X-ray photoelectron (XP) spectroscopy. The titanium oxide cross-linked polydiacetylene (TiOPDA) hybrid films exhibited good thermal and mechanical stabilities.

**Keywords:** ALD, MLD, Hybrid film

