

## Synthesis of Acid-free Inorganic-Organic hybrid materials for Optical Thin Film Technology

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In the past, inorganic materials such as Nb<sub>2</sub>O<sub>5</sub>, SiO<sub>2</sub>, TiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> were used in the field of materials for optical thin film in display by a sputtering method. Because these materials have good transparency, high- or low-reflective index properties, resistance to acid and base, and so on.

However, inorganic materials are not suitable for flexible device due to their brittleness and sputtering system costs, much with damage on the substrate due to high voltage of plasma. For this reason, Inorganic-organic hybrid materials are preferred in the industry. Typical hybrid materials are synthesized by sol-gel process with aid of acid-catalyst. Unfortunately, acid-catalyst causes corrosion of transparent electrode. Therefore, it has a bad effect on the lifetime of display.

In this study, acid-free trialkoxysilane-capped PMMA-titania and -silica with aid of alcohol and salt was synthesized by an in-situ sol-gel process for optical high- and low-reflective index materials. These materials were applied to thin film optics like anti-reflectance, touch panel, OLED and so on.