

Synthesis of highly refractive film including surface modified  $ZrO_2$  nanoparticles with silane coupling agent

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$ZrO_2$  is useful material as high refractive index for providing high performance optical films. But  $ZrO_2$ -mixed organic resin is hard to coat on film uniformly, because  $ZrO_2$  has bad dispersion problem. So it is hard to expect improvement of films refractive index. Therefore, the surface modification with hydrophobic agent is essential for dispersing  $ZrO_2$  nanoparticles uniformly into the organic resin. In this study, silane coupling agents modified  $ZrO_2$  nanoparticles are synthesized using zirconium n-propoxide, benzyl alcohol, and then modified with two kinds of bifunctional silane coupling agents such as, Methacrylopropyltrimethoxysilane(MPS) and Decyltrimethoxysilane(DTMS). The zirconia particles consisted of intrinsic  $ZrO_2$  crystallite and 5-10 nm sizes. The modified zirconia particles show good chemical bonding between  $ZrO_2$  and silane coupling agents so, hydrophobicity enhanced in water floating test before modified samples. The refractive index for sample containing modified zirconia shows 1.6 which is higher than that of before modified sample.