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Robust transparent protective hard-coating using physicochemically-incorporated silica nanoparticles and organosiloxanes

We report on the synthesis of a silica nanoparticle (NP)-reinforced oligosiloxane nanohybrid material (SM-nanocomposite) and demonstrate its properties as a robust transparent hard coating material for various applications. The oligosiloxane (MMO) resin as a matrix was synthesized using methyl and methacryl silanes via a hydrolytic sol-gel condensation. The silica NPs with various sizes (12, 20 and 60 nm) as nanofillers were also synthesized through a hydrolytic sol-gel condensation, and the surface of NPs was organically modified with methyl and methacryl functions, which allowed stable dispersion and chemical cross-linking of the NPs with MMO matrix. In this work, we introduce synthetic steps of the nanocomposite and discuss the optical, morphological, thermal and mechanical properties of the composite.

Preferred topic

Industrial applications

Primary authors: Dr IM, Hyeon-Gyun (Korea Electrotechnology Research Institute (KERI)); Dr KANG, Dong Jun (Korea Electrotechnology Research Institute (KERI))

Presenter: Dr KANG, Dong Jun (Korea Electrotechnology Research Institute (KERI))