

SOL-GEL DERIVED COATING MATERIALS

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Sol-gel science and technology has experienced a remarkable development in the last thirty years. Since the early application of sol-gel film in optical coatings, various new uses for sol-gel films have appeared in protective, electronic, membrane, and sensor applications. The functional coatings, providing capabilities such as scratch and abrasion resistance, antireflection, antiglare, conductivity, antifogging were developed by combination of inorganic nanoparticles and organic/inorganic binders. A scratch/abrasion resistant coating for optical lens was prepared by hydrolysis and partial condensation of tetraethoxysilane (TEOS)/ γ -glycidoxypropyltrimethoxysilane (GPTMS) in the presence of colloidal silica and epoxy resin. The scratch resistance and refractive index can be controlled by varying the chemical composition. Antireflective, antistatic coating was achieved by double layer coating composed of conductive nanoparticle-containing layer (high RI) and silica-containing layer (low RI). Other specialty coatings including weather resistant coating, antifouling coating and self-cleaning coating were also developed using organically modified silane compounds.