

Inorganic–Organic Hybrid Hard Coating Solution Using 3–Glycidoxypropyltrimethoxysilane and Layer Silicate

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Solvent-borne type hard coating solution was prepared using organo-silanes and layer silicate nanocomposites. Intercalation and surface grafting of 3-glycidoxypropyltrimethoxysilane (GPTMS) into layer silicate (Laponite) resulted in silane-layer silicate nanohybrids with an ordered stacking structures ($d_{001} = \sim 13 \text{ \AA}$). The silane-silicate hybrid material was fully dispersed in a mixed solvent of methanol and 2-butoxyethanol, leading to a solvent-borne type hard coating solution. This novel inorganic-organic hybrid coating solution was successfully applied for hard coating material with excellent performances in pencil hardness, solvent-resistance, film adherence and surface glossy. Extended thermal curing at 110 °C resulted in a great enhancement of surface hardness and solvent resistance.