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Abstract
In this research, organic/inorganic nanocomposite of acrylic resin and silica (SiO2) aiming to improve the coating characteristics were prepared via direct addition of silica sol to the acrylic polyol which was then crosslinked with isocyanate.
The effects of the molecular weight of acrylic polyol on the properties of the cured film, such as hardness, solvent resistance and Tg, were first demonstrated. The hardness of the prepared film was enhanced with increasing crosslinking agent and curing time.
The silica sol additions were prepared by encouraging the grafting of polymer on to silica particle through the reaction of －OH group of HEMA monomer with －OH group on the surface of silica. Variables, such as SiO2 content, pH, reaction temperature and reaction time, were studied to investigate their effects on Tg, solvent resistance of the prepared coating.
On the other hand, in order to strengthen organic/inorganic interface, an acrylic polyol was synthesized with addition of MSMA monomer. By adjusting pH of the MSMA containing polymer solution, it was found that MSMA is grafted on to the silica particle via covalent bond formation between MSMA and silica particle. The covalent bonded interface contributes greatly to the enhancement in the solvent resistance of the coating materials.
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