

Thermal Insulation Characteristics of UV Curable Hybrid Coatings with Closed Pore Structured Beads

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In recent years, the development of thermal insulating coating materials to be applied on the window system in the building or house has increasingly been required to save energy cost and to minimize CO₂ emissions by reducing the use of carbonaceous fuel. In the present study, we prepared coating materials with improved thermal insulation property by incorporating porous fillers with closed pore structure such as hollow glass and polymer beads. The UV curable resin system consisting of various oligomers such as hexa aliphatic urethane acrylate (UP118), Trimethylolpropane triacrylate(TMPTA), Hexanediol Diacrylate(HDDA) and photoinitiator(Irgacure184) was employed as an organic binder. The cured coating glass was prepared via bar coating and UV radiation. The effects of hollow bead type and content on the morphology, optical transmittance, and adhesion between coating layer and glass substrate were investigated. Moreover, thermal conductivity of the coated glass was measured through laser flash analysis (LFA) method to evaluate the thermal insulation property.