Title (1)	:	**Synthesis and Characterization UV-Curable Waterborne Polyurethane Acrylate/Al2O3 Nanocomposite Coatings Derived from Jatropha Oil Polyol**
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Abstract	:	A new UV-curable waterborne polyurethane acrylate/alumina (UV-WPUA/Al2O3) coatings were successfully developed. The waterborne polyurethane acrylate (WPUA) dispersion was synthesized by reacting jatropha oil polyol (JOL) with isophorone diisocyanate (IPDI), 2,2-dimethylol propionic acid (DMPA), and 2-hydroxyethyl methacrylate (HEMA) via in-situ and anionic selfemulsifying methods. The WPUA/Al2O3 dispersion was formulated by various sonicating concentrations of alumina nanoparticles (0.3, 0.6, 0.9, and 1.2 wt%) into WPUA dispersion. The UVWPUA/Al2O3 coatings were obtained with 75 wt% oligomers, 25 wt% monomer trimethylolpropane triacrylate (TMPTA), and 3 wt% of a commercial photoinitiator (benzhophenol) for UV-curing were used. The effect of Al2O3 nanoparticles on WPUA coatings was analyzed by FTIR, surface morphology, and coating performance properties such as pendulum hardness, pencil hardness, scratch resistance, and adhesion test. FTIR revealed the formation of JOL, neat UV-WPUA, and UV-WPUA/Al2O3 coatings, respectively. FESEM/EDX demonstrated that Al2O3 nanoparticles at the lower loading (up to 0.6 wt%) were well-dispersed correlated with contact angle (CA). The hardness property can reach 63.4% at the lower concentration of the Al2O3 addition 0.6 wt%. The adhesive strength, scratch hardness, and scratch resistance were greatly improved to 5B, 5H, and 2N, respectively…see more.