

Superhard coatings on plastics by nanoparticles

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Highly abrasion resistant surfaces on polycarbonate substrates have been prepared by coating them with inorganic-organic nanocomposites (NANOMER). The coatings show 2-4 % haze after 1000 cycles of Taber abrasion test (CS-10F, 500 g load). By overcoating the NANOMER layer with a second, very thin layer consisting of polymerizable nanoparticles, extremely high abrasion resistant coatings with less than 2 % haze after 1000 cycles of Taber abrasion test and an excellent adhesion (cross cut and tape test 0/0) were achieved simply by wet coating techniques.

After dip coating and drying the NANOMER coating (thickness 5-7 μm) at ambient temperature, the second coating with the polymerizable nanoparticles was applied „wet on wet,, by dip coating as well and then cured at 130 °C for two hours. The resulting thickness of the topcoat could be varied from 150 to 600 nm. The topcoated substrates showed excellent weather stability (no damage after a testing period of 700 h in the QUV test) and high chemical resistance.

This technique offers the possibility of large area coatings by wet coating techniques (e. g. flow coating, dip coating) for architectural or automotive glazing.