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## FUNCTIONALIZED MICROGELS FOR ACRYLIC COATINGS

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The aqueous dispersions of functionalised copolymer microgel particles were synthesized by emulsion polymerization. There were prepared water-borne dispersions based on methyl methacrylate, butyl methacrylate, 2-hydroxyethyl methacrylate copolymers with different levels of allyl methacrylate cross-linker. The functionalised microgels were investigated as reactive polymer fillers in mixtures with a water-borne film-forming dispersion and two types of commercial solvent acrylic binders. Properties of coatings cast from mixtures of aqueous dispersion of hard microgel particles and film-forming water-borne dispersion were investigated. The film properties were studied in relation to the components ratio and the addition of an isocyanate curing agent.

Further, the swelling behaviour of microgels in the presence of organic solvents (aliphatic ketones) was studied. The extent of microgel particles swelling was evaluated using the dynamic light scattering, the potentiometric titration of accessible hydroxyl groups and the solvent uptake measurements. It was found that the swelling ability of microgels decreased with growing degree of cross-linking. Microgels comprising copolymerized butyl methacrylate swelled less in aliphatic ketones than microgels without this comonomer. Among all the investigated solvents, acetone was found to be the strongest solvent, while 5-methyl-2-hexanone (methyl isopentyl ketone) was shown to be the weakest one.

The goal of this work was focused mainly on the influence of microgels incorporated into the commercial thermoplastic or thermosetting solvent-borne acrylic binders on the properties of coatings. The microgels were treated in the form of organic dispersion of swollen particles. The effect of the microgel content and the addition of an isocyanate curing agent were investigated. It was shown that the application of functionalised microgels that were redispersed in acetone did not affect the surface appearance and transparency of coatings. Moreover, the presence of microgel network precursors accelerated film curing at ambient temperature and improved final hardness of coatings.

*Keywords:* Emulsion polymerization; Microgel swelling; Acrylic latexe; Network precursors

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