

PROCESS AND PRODUCT TECHNOLOGY

硅溶胶/苯乙烯-丙烯酸酯共聚物无机-有机杂化水分散液的制备和表征
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摘要 A stable silica sol with 3-5 nm in diameter, which can form homogeneous film without crack, was prepared and characterized. Then, the inorganic-organic hybrid aqueous dispersion composed of such a silica sol and an emulsion of styrene (St) and acrylate (Ac) copolymer was prepared and the hybrid effect between the silica sol and poly (St-co-Ac) was observed by Fourier transform infra-red (FT-IR) spectroscopy. The toughness of the film prepared by this kind of hybrid aqueous dispersion was excellent, as it was enhanced appreciably by commixing with a small amount of poly (St-co-Ac) emulsion. Some amino-polysiloxane modified hybrid aqueous dispersions were also prepared and the properties of the modified dispersions and their films were investigated. The experimental results showed that the film prepared with such an amino-polysiloxane modified hybrid dispersion exhibited excellent hydrophobicity and low surface energy after heat treatment for 1.5 h, during which the formation of the graft copolymer was observed. The surface energy of this film decreases as a result of the enrichment of siloxane segments on the film surface.

关键词 硅溶胶 苯乙烯-丙烯酸酯 共聚物 无机-有机杂化水分散液 制备 表征

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Preparation and Characterization of Hybrid Aqueous Dispersions Composed of Silica Sol and Poly (styrene-co-acrylate)

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Abstract A stable silica sol with 3-5 nm in diameter, which can form homogeneous film without crack, was prepared and characterized. Then, the inorganic-organic hybrid aqueous dispersion composed of such a silica sol and an emulsion of styrene (St) and acrylate (Ac) copolymer was prepared and the hybrid effect between the silica sol and poly (St-co-Ac) was observed by Fourier transform infra-red (FT-IR) spectroscopy. The toughness of the film prepared by this kind of hybrid aqueous dispersion was excellent, as it was enhanced appreciably by commixing with a small amount of poly (St-co-Ac) emulsion. Some amino-polysiloxane modified hybrid aqueous dispersions were also prepared and the properties of the modified dispersions and their films were investigated. The experimental results showed that the film prepared with such an amino-polysiloxane modified hybrid dispersion exhibited excellent hydrophobicity and low surface energy after heat treatment for 1.5 h, during which the formation of the graft copolymer was observed. The surface energy of this film decreases as a result of the enrichment of siloxane segments on the film surface.

Key words silica sol, copolymer, aqueous dispersion, inorganic-organic hybrid, amino-polysiloxane

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