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材料科学与工程

聚氨酯-环氧树脂-丙烯酸酯杂合分散体的合成

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摘要 以三羟甲基丙烷（TMP）为交联剂，先用环氧树脂改性聚氨酯（PU），得到环氧树脂改性的水性聚氨酯（WPUE）分散体，然后加入甲基丙烯酸甲酯（MMA）和引发剂偶氮二异丁腈（AIBN），通过自由基乳液聚合得到聚氨酯-环氧树脂-丙烯酸酯（WPUEA）杂合分散体，并通过傅里叶红外光谱、凝胶渗透色谱、粒径分析仪和透射电镜对其进行了表征。研究了－NCO/OH总摩尔比、交联剂TMP的量、环氧树脂种类和量、MMA的量等对WPUEA杂合分散体性能以及涂膜性能的影响。实验结果表明，选用E20环氧树脂，当－NCO/OH总摩尔比为12～15， TMP的添加量为4%～8%，E20添加量为4%～6%，MMA添加量为10%～30%时得到WPUEA杂合分散体性能较佳，所得到的水性WPUEA杂合分散体的涂膜硬度为073，光泽度达到85，表干时间为30min，冻融循环大于5，同时耐水性和耐溶剂性均得到提高。该产品可以取代溶剂型产品。

关键词 水性聚氨酯；环氧树脂；甲基丙烯酸酯甲酯；杂合分散体

分类号

Preparation of epoxide-acrylate-polyurethane hybrid dispersions

Abstract

The aqueous polyurethane modified by epoxide resin(WPUE) was prepared with trimethylolpropane(TMP) as cross linker, then epoxide-acrylate-polyurethane(WPUEA) hybrid dispersions were synthesized by free-radical emulsion polymerization which were carried out by using azodiisobutyronitrile (AIBN) as initiator and methyl methacrylate (MMA) as monomerThe WPUEA hybrid dispersions were characterized with FT-IR, gel permeation chromatography (GPC), Malvern particle size analyzer and TEMThe influences of the total mole ratio of NCO/OH, the type and amount of epoxide resin, the amounts of TMP and MMA on the properties of the hybrid dispersions and the coating films were studiedThe experimental results showed the WPUEA hybrid emulsions had better properties at total mole ratio of-NCO/OH 12—15, TMP 4%—8%, E20 4%—6%, MMA 10%—30%At the same time, the coating films of WPUEA showed such better properties as:hardness 073,gloss 85, surface drying time 30 min, freezing and thawing cycle above 5The water resistance and solvent resistance of the films of WPUEA were improvedThe modified WPUEA hybrid emulsions could substitute for solvent polyurethane.

Key words aqueous polyurethane； epoxide resin； methyl methacrylate； hybrid emulsions

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