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网络间含离子键的聚氨酯/接枝乙烯基酯树脂互穿聚合物网络 研究

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摘要 分别以双酚-A型环氧树脂E-51和聚醚型环氧树脂E-46为原料合成了两种二乙胺-环氧树脂和加成多元醇(分别命名为AE-51，AE-46)，将其和甲基丙烯酸一起用于合成聚氨酯/接枝乙烯基酯树脂(PU/接枝VER)互穿聚合物网络(IPN)，使之在两个网络间形成离子键。实验结果表明，这类新型的IPN材料中两个网络间的互穿程度与相容性进一步提高，从而导致刚性的接枝VER对弹性的PU网络有更好的增强效果。DSC和FTIR的测定结果表明，在含AE-51的IPN中，由于离子键的作用使PU网络硬段的有序结构遭到很大程度的破坏，与AE-51和PU网络中的硬段以及VER网络有较好的相容性有关，因此这类IPN材料具有较好的力学性能。

关键词 聚氨酯 网状聚合物 环氧树脂 形态结构 离子键 双酚A

分类号 TQ32

Polyurethane/Graft vinyl ester resin interpenetrating polymer networks containing ionic bonds

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Abstract Two kinds of epoxy resin adduct polyols, named AE-51 and AE-46, respectively, were synthesized by the reaction of diethylamine with bisphenol-A type epoxy resin(E-51) or triethylene glycol type epoxy resin(EER-46), AE-51 o re AE-46 was used together with methacrylic acid (MAA) to form ionic bonds in well-defined polyrethane/graft vinly ester resin(PU/graft-VER) interpenetrating polymer networks (IPNs). Experimental results showed that the compatibility and/or the interpenetration between the PU network and the graft VER network were enhanced further for PU/graft-VER IPNs containing ionic bonds compared with that without ionic bonds. For IPNs containing ionic bonds, the ordered structure of PU hard segments in IPNs prepared from AE-51 was far more suppressed than that in IPNs prepared from AE-46. It was found that AE-51 was compatible with both PU hard segments and graft-VER due to the ionic bonds and similar bisphenol-A structures existed in PU and graft-VER network. These suggested that larger amounts of graft-VER could enter into PU hard segments so as to drastically suppress the ordered structures of hard segments in PU. The AE-46 existed in PU network, however, was mainly miscible with soft segments of PU because of its poly (oxylene)segments. In this case, the ordered structure of hard segments in PU was not affected appreciably by such a kind of IPNs. The results of mechanical test indicated that IPNs prepared from AE-51 showed higher tensile strength and lower elongation at break than the IPNs made from AE-46. All these different mechanical properties for IPNs studied could be correlated well with their morphologies.

Key words POLYURETHANE NETWORK POLYMER EPOXY RESINS MOPHOLOGY STRUCTURE IONIC BONDS BISPHENOL A

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