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研究论文

聚酰亚胺硅氧烷/聚酰亚胺两面异性复合膜的制备及性能研究

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摘要 以氨丙基封端的聚二甲基硅氧烷(PDMS)、 4,4'-二氨基二苯醚(4,4'-ODA)和3,4,3',4'-联苯四酸二酐(s-BPDA)为原料, 合成了聚酰胺酸硅氧烷嵌段共聚物. 将此嵌段共聚物和聚酰胺酸(s-BPDA/4,4'-ODA)共混, 通过控制制膜条件, 利用各组分在不同溶剂中的溶解度的差别, 使聚酰亚胺硅氧烷富集在膜的上表面. 因为两相在结构和性质上的相似性, 当聚酰胺酸硅氧烷和聚酰胺酸混合时, 具有很好的相容性, 消除了两相间的界面, 从而制备了优异的聚酰亚胺硅氧烷/聚酰亚胺两面异性的复合膜材料. 利用X射线光电子能谱(XPS)和水滴接触角对此复合膜进行了表征, 证明了此复合膜的两面异性, 并对此复合膜进行了热性能和机械性能研究, 发现此薄膜保持了聚酰亚胺优异的性能.

关键词 聚酰亚胺硅氧烷 复合膜 表面修饰

分类号 0631

Preparation and Properties of Composite Film of Poly(imidesiloxane) Copolymer/Polyimide with Different Performances on Each Side

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Abstract In order to make normal PI films with some new characteristics to be used as microelectronic materials, such as excellent adhesive properties and low electric constants, a novel kind of PI composite film containing different contents on each surface was prepared with chemical surface-modification, from poly(imidesiloxane) copolymer and polyimide. First, poly(imidesiloxane) copolymer was synthesized from 4,4'-oxydianiline(ODA), *α,ω*-aminopropylpoly(dimethylsiloxane)(PDMS) and 3,3',4,4'-biphenyltetracarboxylic dianhydride(s-BPDA). Then, a THF solution of the copolyamide acid and a DMAc solution of the polyamide acid were mixed thoroughly and doctored on a glass plate dried at RT, and then with thermal imidization to get the composite film. All characterization results from X-ray photoelectron spectroscopy(XPS) and contact angle measurements show that the PDMS has segregated to the air surface and predominated in it. Moreover, the composite film has nearly the same excellent thermal properties and mechanical properties as the normal PI films.

Key words Poly(imidesiloxane) Composite film Surface modification

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