

## SAW膜材料HFIP功能化PS-b-PMPS的合成与吸附研究

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摘要:

探讨了六氟代异丙醇(HFIP)功能化聚苯乙烯/聚甲基苯基硅氧烷嵌段共聚物(PS-b-PMPS)的合成与涂膜方法.采用无水解缩聚方法合成了环状聚甲基苯基硅氧烷,阴离子聚合制备了窄分子量分布(Mw/Mn=1.99)的PS-b-PMPS,与六氟丙酮反应得产物.用IR、GPC、乌氏粘度计等方法进行表征.用旋涂法涂膜,2,4-二硝基甲苯(2,4-DNT)进行检测,结果表明2,4-DNT浓度为750mg/m<sup>3</sup>时,聚合物在30秒内能快速地脱附与吸附.且当硅氧烷所占的链段摩尔分率为45%以上时聚合物的涂膜性能更好.

关键词: SAW化学传感器;聚苯乙烯;聚甲基苯基硅氧烷;嵌段共聚物;阴离子聚合;爆炸物

## Study on Preparation and Adsorption of HFIP Functionalized PS-b-PMPS for SAW Chemical Sensor

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**Abstract:**

Hexafluoroisopropanol (HFIP) functionalized poly(styrene-b-methylphenylsiloxane) (PS-b-PMPS) has been synthesized, characterized, and tested as microsensor coatings on SAW device for 2,4-dinitrotoluene (2,4-DNT) vapor absorption sensitivity. Ring siloxane was prepared by anhydrous condensation, PS-b-PMPS with a narrow molecular weight distribution (Mw/Mn=1.99) was synthesized by anionic polymerization, which then reacted with hexafluoroacetone. The materials were characterized by IR, GPC and Ubbelohde viscosity meter. The polymer, which was coated on SAW device by spin coating, can achieve absorption and desorption in approximately 30s at 2,4-DNT concentration of 750mg/m<sup>3</sup>, and the polymer exhibited excellent coating properties when the molar ratio of siloxane to PS-b-PMPS was more than 45%.

**Keywords:** SAW chemical sensor; polystyrene; polymethylphenylsiloxane; block copolymer; anionic polymerization; explosive

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