原子能科学技术 2008 42 (5): 404-407 ISSN: 1000-6931 CN: 11-2044/TL

化学

电子束辐照聚二甲基硅烷的结构分析

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收稿日期 2006-12-13 修回日期 2007-1-21 网络版发布日期: 2008-5-20

摘要 在室温、真空条件下，利用加速器产生的高能电子束辐照聚二甲基硅烷（PDMS）试样，研究吸收剂量对其结构的影响。通过气相色谱质谱联用分析可知，辐照过程中产生了少量H_2和CH_4，且H_2的产率高于CH_4。FT-IR、激光拉曼光谱以及XRD分析结果表明，经超高剂量（MGy级）辐照后，聚二甲基硅烷的化学结构未发生明显变化，其晶态结构也未遭破坏。这些结果说明，PDMS具有异乎寻常的耐辐射性能，这可能归因于其主链上规整Si—Si键的σ电子离域运动所形成的σ共轭体系的特殊结构。

关键词 聚二甲基硅烷；电子束；辐照；结构分析

分类号 TQ264.1；O631.34

Structural Analysis of Polydimethylsilane Irradiated by Electron Beam

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Abstract Polydimethylsilane (PDMS) samples were irradiated by electron beam (EB) in vacuum at room temperature, and the relationship between its structure and absorbed dose was investigated. The result of GC-MS reveals that a small amount of $H_2$and $CH_4$is released. FT-IR, Raman spectra and XRD curves show that the chemical and crystal structure of PDMS are not changed after irradiated with extremely high dose of several MGy. These results indicate that the radiation tolerance of PDMS is excellent, which might be caused by the delocalized σ electron of the highly ordered Si—Si skeletons.

Key words polydimethylsilane _ electron beam _ irradiation _ structural analysis

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