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研究报告

氘代聚乙烯的合成与表征

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摘要 为满足激光惯性约束聚变（ICF）对氘代聚合物的需求，本工作利用阴离子聚合方法制备的氘代聚丁二烯（PBD6），通过氘气催化加氘的方法，制备了氘代聚乙烯(d-PE)。并通过红外、固体核磁共振以及高温凝胶渗透色谱（GPC）等途径对产物的纯度及氘代率进行了表征。结果表明，本工作合成的氘代聚乙烯产物具有较高的饱和度和氘代率，聚合物的分子量和分散度均达到了ICF实验的初步需要。

关键词 氘代聚乙烯；氘代率；钯催化氢化

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Synthesis and Characterization of Deuterated Polyethylene

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Abstract

Due to its remarkable isotope effects, excellent kinetic stability towards C—D bond break, high degree of deuteration, and being non- radioactive, deuterated polyethylene (d- PE) is widely used in many fields, such as in inertially confined fusion (ICF)

as target material, in production of low loss plastic optical fibers, and in study

of the compatibility of different polymers. For the necessary of ICF, the d-PE was synthesized by the anionic polymerization and palladium- catalyzed hydrogenation. Furthermore, by the method of FTIR, ^{1}H NMR and GPC, the deuterated ratio and structure of d- PE have been characterized. The results show that the d- PE has the high deuterated ratio and molecular weight, narrow molecular- weight distribution, the polymer material fits the basic necessary of ICF .

Key words deuterated polyethylene; deuterated ratio palladium catalyzed hydrogenation

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