

论文

聚合物重氮偶合反应制备二阶非线性光学聚酰亚胺

黄福荣, 和亚宁, 叶钢, 王晓工

清华大学化工系高分子研究所教育部先进材料重点实验室; 清华大学化工系高分子研究所教育部先进材料重点实验室 北京

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摘要 在合成一种新的二胺单体[2-(*N*-乙基苯胺基)-乙氧基对苯二胺]基础上, 与6FDA(4, 4'-(六氟异丙基)-双邻苯二甲酸酐)反应制备了聚酰亚胺先驱聚合物, 利用聚合物的后重氮偶合反应将硝基偶氮苯生色团引入到聚合物当中. 此方法避免了亚胺化苛刻条件对生色团的影响, 在温和条件下能达到高的官能化度. 对侧链型偶氮聚酰亚胺材料的二阶非线性光学性能进行了测试, 其 d_{33} 可达39.2 pm/V.

关键词 [后重氮偶合](#) [二阶非线性](#) [聚酰亚胺](#)

分类号

NONLINEAR OPTICAL AZO POLYIMIDE FROM POST-POLYMERIZATION AZO-COUPPLING REACTION

HUANG Furong, HE Yanning, YE Gang, WANG Xiaogong

Department of Chemical Engineering; Laboratory for Advanced Materials; Tsinghua University; Beijing 100084

Abstract A nonlinear optical(NLO) azo polyimide has been synthesized by post-polymerization azo coupling reaction. In the process, a new diamine monomer, ([2-(*N*-ethylamino)-ethoxyl]*P*-phenylenediamine), was synthesized and then reacted with 2,2-bis(3,4-dicarboxyphenyl)hexafluoroisopropylidene dianhydride(6FDA) to obtain a polyimide-based precursor polymer. The precursor polymer owned excellent solubility in DMSO, DMF and other polar organic solvents. Through post-polymerization azo-coupling reaction of the precursor polymer, the NLO azo polyimide was obtained. This synthetic scheme can avoid exposure of the azo chromophore to the rigorous imidization conditions required in the synthesis of polyimide. By the scheme, the degree of functionalization of the azo polyimide can reach about 100% under mild reacting condition and the product can be easily separated from the solution. The polymer synthesized was characterized by using spectroscopic methods and thermal analysis. The polymer shows good solubility, processibility and thermal-stability. The d_{33} of the polymer film is 39.2 pm/V.

Key words [Post-polymerization azo-coupling reaction](#) [Second-order nonlinear optic](#) [Polyimide](#)

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通讯作者 王晓工

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