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论文

双酚A二炔丙基醚与4,4′-联苯二苄叠氮的合成及聚合反应研究

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摘要 合成了两种单体双酚A二炔丙基醚与4,4′-联苯二苄叠氮,研究了一种新的低温聚合体系——双酚A二炔丙基醚与4,4′-联苯二苄叠氮在烘箱中的本体聚合行为. 通过红外、核磁共振以及质谱、元素分析等表征了单体的结构. 利用傅立叶红外技术(FTIR)跟踪了聚合反应过程中特征基团的变化,采用差示扫描量热技术(DSC)研究了聚合反应工艺及其动力学,热失重分析(TGA)考察了聚合产物的热稳定性能. 通过Kissinger法和Ozawa法获得了反应的一些动力学参数. 结果表明,双酚A二炔丙基醚与4,4′-联苯二苄叠氮易发生1,3偶极环加成聚合反应,在聚合物结构中形成三唑五元环,它们的聚合起始温度在70℃左右,聚合反应的主反应是一级反应,表观活化能ΔE=84.6kJ/mol,指前因子A=4.865×$10^{10}$$min^{-1}$. 同时发现,聚合物具有较好的热稳定性能.

关键词 双酚A二炔丙基醚 叠氮化合物 1 3-偶极环加成反应 三唑 低温固化

分类号

1,3-DIPOLAR CYCLOADDITION POLYMERIZATION OF BISPROPARGYL ETHER OF BISPHENOL-A WITH 4,4′-BIPHENYL DIBENZYL AZIDE AND THEIR THERMAL ANALYSES

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Abstract Two monomers,bispmpargyl ether of bisphenol-A(BPEBA)and 4,4'-biphenyl dibenzyl azide (BPDBA) were synthesized and characterized with FT-IR,^{1}H-NMR and elementary analysis. Their bulk polymerization was conducted in an oven,and a polytriazole was obtained by the 1,3-dipolar cycloaddition polymerization. The variation of the reactively functional groups during the polymerization was traced by FT-IR,the polymerizing reaction of BPEBA with BPDBA and its kinetics were investigated by using differential scanning calorimetry (DSC) at a variety of heating rates. Some kinetic parameters including the reaction order,activation energy and pre-exponential factor were obtained with the Kissinger and the Ozawa methods. The thermal stability of the polymer was evaluated with TGA. The results showed that BPEBA and BPDBA were easy to form polytriazole by 1,3-dipolar reaction. The polymerizing reaction happened at low temperature,*i*. *e*. 70℃,the reaction was a one order reaction,the activation energy △E=84.6 kJ / mol. and the pre-exponential factor A=4.865×10^{10}. min^{-1}. The polymer exhibited good thermal stability.

Key words Bispropargyl ether of bisphenol-A （BPEBA） Azide 1 3-Dipolar cycloaddition Triazole Low temperature curing

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