

研究论文

# 无溶剂法合成4,6,10,12,16,18,22,24-八羟基-2,8,14,20-四- {(联三-(3-苯基-2,4,8,10-四氧杂螺[5.5]十一烷基))-(4-(2- (4,6,10,12,16,18,22,24-八羟基)杯芳基)苯基)}杯芳烃螺环树形 大分子化合物

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**摘要** 以对苯二甲醛、丙二腈为原料, 合成对苯二甲醛单缩醛, 再与季戊四醇反应得到了2,4,8,10-四氧杂-2,9-二(4-二氰基乙烯基苯基)螺[5.5]十一烷, 经水解, 与丙二腈反应, 制备了中间体2,4,8,10-四氧杂-2-(4-二氰基乙烯基苯基)-9-(4-甲酰基苯基)螺[5.5]十一烷(3). 用乙酸酐保护的对苯二甲醛单缩醛与间苯二酚反应, 制备了杯芳烯中间体(6). 将化合物6与过量的化合物3反应, 得到中间体7, 经水解后与过量的化合物6反应, 得到了4,6,10,12,16,18,22,24-八羟基-2,8,14,20-四-{(联三-(3-苯基-2,4,8,10-四氧杂螺[5.5]十一烷基))-(4-(2-(4,6,10,12,16,18,22,24-八羟基)杯芳基)苯基)}杯芳烃螺环树形大分子化合物(9). 总收率为12.7%. 产物结构用IR,  $^1\text{H NMR}$ ,  $^{13}\text{C NMR}$ , MS 和元素分析进行了表征, 对影响反应的因素进行了讨论.

**关键词** [无溶剂合成](#) [杯芳烯](#) [树状化合物](#) [季戊四醇](#) [苯二甲醛](#) [丙二腈](#)

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## Solvent-free Synthesis of 4,6,10,12,16,18,22,24-Octa-hydroxy-2,8,14,20-tetra{ (tri-(3-phenyl-2,4,8,10-tetraoxaspiro[5.5]undecyl))-(4-(2-(4,6,10,12,16,18,22,24-octahydroxy)Calixresorcinarenyl)phenyl)} calixresorcinarene Spiro macromolecular Dendrimer

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**Abstract** The terephthalaldehydes mono-acetal was prepared by the reaction of terephthalaldehyde and malononitrile. The 2-(4-dicyano-vinyl-phenyl)-9-(4-formylphenyl)-2,4,8,10-tetraoxaspiro[5.5]undecanes(3) were given through terephthalaldehydes mono-acetal reacting with pentaerythritol and then the hydrolysis occurred in the presence of  $\text{InBr}_3$ . The calixresorcinarenes 6 was prepared by using terephthalaldehydes mono-acetal and resorcinol as the material. The rough compound 6 reacting with compound 3, calixresorcinarene macromolecular dendrimer of 4,6,10,12,16,18,22,24-octahydroxy-2,8,14,20-tetra{ (tri(3-phenyl-2,4,8,10-tetraoxaspiro[5.5]undecyl))-(4-(2-(4,6,10,12,16,18,22,24-octahydroxy)calixresorcinarenyl)phenyl)} calixresorcinarene(9) was produced. The product was characterized by IR,  $^1\text{H NMR}$ ,  $^{13}\text{C NMR}$ , MS and elemental analysis. The effect factors on the reactions were discussed.

**Key words** [Solvent-free synthesis](#) [Calixresorcinarenes](#) [Dendrimer](#) [Pentaerythritol](#) [Terephthalaldehydes](#) [Malononitrile](#)

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