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材料物理和化学

2,3,5,6-全氟亚苯基在液晶分子设计及合成上的应用

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摘要: 设计并合成了两类含氟液晶化合物,分别为4-[(4-苯甲酸2,3,4,5,6-四氟苯基)乙炔基]苯甲酸(4-烷氧基)苯酯和4-[(4-苯甲酸2,3,4,5,6-四氟苯基)乙基]苯甲酸(4-烷氧基)苯酯,前者由于将全氟苯环引入了二苯乙炔结构中,所以具有高双折射率和低的黏度,且耐热性好,可作为自适应光学系统空间光调制器液晶材料;后者引入亚乙基结构使分子的双折射率很小且黏度更低,可作为TFT-LCD混合液晶材料中的减黏部分。两个目标化合物分别是通过sonogashira交叉偶联反应和钯催化加氢还原反应获得。

关键词: 含氟液晶 二苯乙炔 亚乙基 自适应光学系统

Applications of 2,3,5,6-Tetrafluorophenylene in Design and Synthesis of Liquid Crystal Molecules

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Abstract: two kinds of fluorinated liquid crystal compounds were synthesized: 4-n-alkoxyphenyl 4-[4-n-alkoxyphenyl-2,3,4,5,6-tetrafluorophenyl] ethynyl] benzoates and 4-n-alkoxyphenyl 4-[4-n-alkoxyphenyl-2,3,4,5,6-tetrafluorophenyl] ethyl] benzoates. Due to introducing 1,4-perfluorophenylene to molecular structure of diphenyl acetylene in the first compounds, it could be used in adaptive system like as application in construction of spatial light modulator because of the high birfringence, low rotational viscosity and thermal stability. The liquid crystal compounds with ethylidene bridge could satisfy the requirements of a low viscosity component in TFT-LCD because of the low birfringence and low viscosity. Two target compounds were synthesized by sonogashira reaction and then Pd/C catalytic hydrogenation.

Keywords: fluorinated liquid crystals diphenyl acetylene ethylidene adaptive system

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