Synthesis, structural elucidation and mesophase behaviour of hexasubstituted cyclotriphosphazene molecules with amide linking unit

ABSTRACT

Alkylation of 4-acetamidophenol with various alkyl halides gave alkylated derivatives 1a-d which were further reduced to form amines, 2a-d. A separate reaction of phosphonitrilic chloride trimer and methyl-4-hydroxybenzoate yielded 3, hexa-(oxy-4-methyl benzoate)cyclotriphosphazene which was then reacted with ethanol and potassium hydroxide to give 4, hexa-(oxy-4-benzoic acid)cyclotriphosphazene. This hexasubstituted intermediate 4 was reacted with a series of intermediates 2a-d to yield the final compounds 5a-d, hexasubstituted cyclotriphosphazene with amide linking unit. All the structures of the intermediates and final compounds were characterized using Fourier Transform Infrared (FTIR) and Nuclear Magnetic Resonance (NMR) spectroscopy. The liquid crystal properties of all the synthesized compounds were determined using Polarized Optical Microscope (POM). POM observations showed that compounds 5a-d exhibited liquid crystal properties of smectic A and smectic C phases.