

Three Nematogen Azobenzene-Based Stationary Phases for Capillary GC: Synthesis and Comparative Study

A. Addoun, O. Ferroukhi, M. DAHMANE, S. Guermouche, J.P. Bayle, M.H. Guermouche

Abstract: In this paper, three laterally substituted liquid crystals termed LCC1, LCC3 and LCC4 were synthesized. Characterization of these substances was carried out by ^1H NMR and ^{13}C NMR; they possess similar core and differ in their lateral substituents. Their thermal stability was conducted by thermogravimetric analysis and showed decomposition beginning at 212, 233 and 264 °C related to LCC1, LCC3 and LCC4, respectively. Thermal properties were determined by differential scanning calorimetry, thermomicroscopy and inverse gas chromatography. The three novel compounds exhibited a nematic mesophase at a defined range of temperatures, which varied from 81 to 55 °C. Lengthening of the lateral substituent seemed to affect the nematic range by decreasing it. Fused-silica capillary columns (30 m \times 0.32 mm) were employed for the analytical study. Numerous mixtures of components of various properties were injected. Particular attention was given to the selectivity towards the close-boiling isomers. These investigations indicated that lateral attached groups had considerable effect on the thermal and chromatographic properties of the liquid crystal compounds. These interesting results may guide in improving the development of new type of liquid crystals with desired properties for a widespread application.

Keywords : Capillary gas chromatography, Liquid crystals, Thermal Properties, Analytical properties