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NOVEL CHIRAL STATIONARY PHASES FOR CHROMATOGRAPHY BASED ON SUPRAMOLECULAR ANALYTICAL METHODOLOGY COMPOUNDS

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Novel chiral stationary phases design is one of the top challenges in modern chromatography. In last decade nanoscale structured materials have become promising because of their high enantioselectivity. But in any cases, chiral recognition is based on the molecular chirality of the stationary phase suggested. In the present work, it was proposed to use for the first time the stationary phases based on supramolecular structures of achiral compounds with induced chirality for the chromatographic separation of enantiomers. Two-dimensional supramolecular structures of uracil and its derivatives, melamine and cyanuric acid were used. As initial adsorbent to modify graphitized carbon black, inert solid support and porous polymers were used. A special method of inducing chirality based on Kondepudi effect was developed. Packed columns for GC and HPLC as well as capillary GC SCOT columns were designed. It was shown, that chiral columns can separate enantiomers of halo alkanes, alcohols, esters and terpenes. High enantioselectivity was achieved when low-boiling racemates were separated. For 2-bromobutane the selectivity factor $\alpha > 3$ was observed. It is the greatest value of α achieved in 2-bromobutane racemate separation. For 2-chlorobutane $\alpha = 2.17$ is also the greatest in all 2-chlorobutane separations. Such good separation was caused

by the fact that one of enantiomers is adsorbed predominantly within the cavity of the supramolecular structure and another one is adsorbed on its surface. Separation on the proposed chiral stationary phase is characterized by the relative standard deviation of retention volumes not more than 7%. The stationary phases suggested showing good stability, as well as thermostability, and stability in normal phase HPLC. The financial support of the Russian Science Foundation (grant 17-73-10181) is gratefully acknowledged.

Biography

Vladimir Yu Guskov completed his Graduation with honors from magistracy of Chemical Faculty of Bashkir State University in 2009, and in 2012 he also defended his PhD thesis in the specialty Physical Chemistry. Now, he works at Faculty of Chemistry of the Bashkir State University as an Associate Professor. He heads the scientific direction of chromatography at Analytical Chemistry Chair. He has 21 scientific papers in Scopus-indexed journals. He works on the novel chiral columns for chromatography, based on supramolecular chirality phenomenon, stationary phase polarity estimation approaches and inverse gas chromatography application to study supramolecular structures properties.

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