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## Separation of parent homopolymers from block copolymers with advanced liquid chromatography methods

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**B**lock copolymers present an important group of materials with numerous applications in science, medicine and technology. In a block copolymer, at least two chemically distinct polymer chains are connected with a chemical bond. Comprehensive molecular characterization of block copolymers is an analytical challenge. A special problem makes a determination of the amount and molar mass of parent homopolymers, which occur in most block copolymers and constitute highly undesired ballast. Gel permeation (size exclusion) chromatography GPC/SEC is commonly employed for the characterization of block copolymers. Molar mass of a precursor, the block polymerized as first, is determined by GPC/SEC and the same method serves for the approximate assessment of total molar mass of the block copolymer under study. Due to its low separation selectivity and detector sensitivity, GPC/SEC can hardly identify the presence of parent homopolymers and render their molar mass. We will discuss principles and applications of the new separation methods namely liquid chromatography under limiting conditions of enthalpic interactions, LC-LC and sequential two-dimensional polymer liquid chromatography, S2D LC to solve the above tasks. LC-LC methods are well robust and experimentally feasible. Their separation selectivity is very high and sample recovery is reasonable. LC-LC can efficiently separate both parent homopolymers from diblock copolymers in one single step. The separated sample constituents can be one-by-one forwarded into an on-line GPC/SEC column for determination of their molar mass average and distribution. Parent homopolymers present in the block copolymer at a very low concentration below 1% of can be tracked-down and characterized with help of the S2D LC.

### Biography

Dusan Berek is employed at Polymer Institute, Slovak Academy of Sciences in Bratislava. Served as elected member of the Presidium of the Slovak Academy of Sciences, President of the Slovak Chemical Society, Chairman of the Czecho-Slovak and Slovak National Committee of Chemistry for IUPAC. Corresponding member of the Central European Academy of Sciences and member of the Learned Society of the Slovak Academy of Sciences. Author or co-author of two monographs and 300+ scientific papers in extenso published in refereed periodicals, proceedings and chapters of books, as well as 60+ patents (four of them were licensed) - cited more than 3,000x. Presented over 130 invited plenary, key and main lectures, as well as over 900 regular lectures and poster contributions on symposia and conferences, as well as during lecturing tours to over forty countries. Elected "Slovak scientist of the year 1999" and "Slovak innovator of the year 2002".

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