MICROSTRUCTURAL SEPARATION AND ANALYSIS OF POLYISOPRENE AND POLYETHYLENE OXIDE BY USING LIQUID CHROMATOGRAPHY

Pritish Sinha*, Muhammad Imran Malik, Harald Pasch

University of Stellenbosch, Department of Chemistry and Polymer Science, Private Bag X1, 7602 Matieland, South Africa, E-mail: pritish@sun.ac.za

ABSTRACT

Polymers are complex macromolecules since they show distributions in molar mass, chemical composition, functionality and microstructure. The separation and analysis of polymers according to microstructure is a major challenge in the field of polymer science. There are some applications regarding the separation of polymers according to their microstructure. Pasch et al. separated oligostyrenes regarding tacticity (1). Berek et al. separated poly(methyl methacrylate) regarding tacticity (2) and Kitayama et al. analysed poly(ethyl methacrylate) according to the tactic triads (3). For the first time polyolefins were separated according to tacticity by using high temperature gradient HPLC (4). Recently we have separated blends of polyisoprene regarding their isomeric microstructures by liquid chromatography at critical conditions using a reversed stationary phase (5).

The present study focuses on the separation of polyisoprene and polyethylene oxide regarding microstructure. The separation will be carried out using porous carbon based materials and different solvent mixture combinations. After carrying out the separation the peaks of interest will be fractionated and analysed by Fourier Transform Infrared Spectroscopy and Nuclear Magnetic Resonance Spectroscopy.

References:

(1) Pasch H.; Hiller W.; Haner R. *Polymer* **1998**, *39*, 1515-1523.
(2) Berek, D.; Janco, M.; Hatada, K.; Kitayama, T.; Fujimoto, N. *Polymer J.* **1997**, *29*, 1029-1033.
(3) Kitayama, T.; Janco, M.; Ute, K.; Niimi, R.; Hatada, K.; Berek, D. *Anal. Chem.* **2000**, *72*, 1518-1522.
(4) Macko T.; Pasch H. *Macromolecules* **2009**, *42*, 6063-6067.
(5) Hiller W.; Sinha P.; Hehn M.; Pasch H.; Hofe T. submitted to Analytical Chemistry