Faculty of Engineering
Tokushima University

Characterization and Structural Control of Synthetic Polymers

Professor Koichi Ute

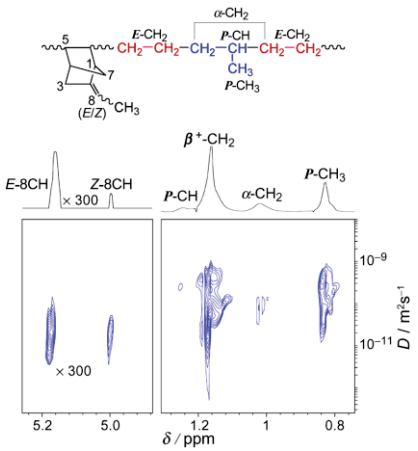

Fig. 1 Molecular weight dependence of chemical composition in an ethylene-propylene copolymer.

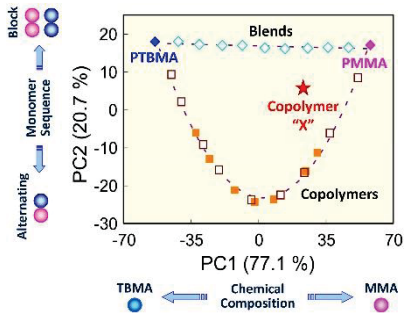

Fig. 2 Principal component score plots showing chemical composition and monomer sequence distribution in methacrylate copolymers.

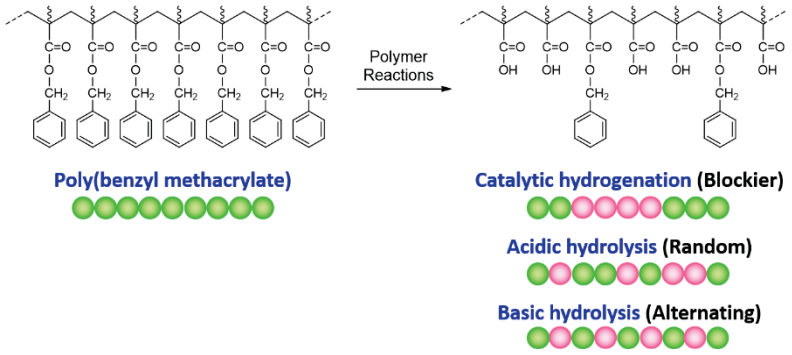

Fig. 3 Monomer sequence distributions in methacrylate copolymers prepared by polymer reactions.

Content:

Recent research and development of industrial or functional polymers increasingly require precise analysis and control of their molecular parameters (molecular weight, comonomer sequence, stereoregularity, etc.) .

The aims of my study are to develop useful methods of polymer characterization by modern NMR (nuclear magnetic resonance) and chromatographic techniques, and to synthesize new polymer materials on the basis of the characterization.

For example, DOSY (diffusion-ordered NMR spectroscopy) is a powerful technique to measure the molecular-weight dependence of chemical composition in copolymers (**Fig. 1**).

Multivariate analysis of the NMR spectra of copolymers is another example of my approaches to precise and quantitative characterization of synthetic polymers (**Fig. 2**). The use of this multivariate approach revealed he mechanism of polymer reactions (catalytic hydrogenation, acidic/basic hydrolysis, etc.) of methacrylate copolymers (**Fig. 2**).

Keywords: polymer synthesis, NMR, chromatography, copolymers

E-mail: ute@tokushima-u.ac.jp
Tel. +81-88-656-7402
Fax: +81-88-656-7404
HP: http://poly.chem.tokushima-u.ac.jp/