

Non-aqueous emulsions with high dispersion stability prepared using a novel block-random-block type emulsifier

Hideki Sakai^a, Arisa Asaba^a, Corentin Cousin^{a,b}, Koji Tsuchiya^a, Kyosuke Arakawa^a, and Kenichi Sakai^a

^aFaculty of Science and Technology, Tokyo University of Science, Japan,

^bUniversity of Lille, France

hisakai@rs.tus.ac.jp

Non-aqueous emulsions consist of hardly miscible solvents, where one forms droplets dispersed in the other and they find applications in personal care and ink. However, preparation of non-aqueous emulsions with high dispersion stability has been difficult because of low adsorption efficiency of emulsifiers at the interface¹. We have reported that non-aqueous emulsions can be stabilized by the formation of ion complex between block-random copolymers with amino groups (Fig.1-A) as an emulsifier in the continuous phase and polyacrylic acid as an auxiliary emulsifier in the dispersed phase. In this study, we developed a new block-random-block copolymer with hydrophobic blocks attached to both ends of a random polymer unit (Fig.1-B). Furthermore, we compared its emulsification property with that of the conventional emulsifier.

Non-aqueous emulsions were prepared by adding dispersed phase consisting of polyacrylic acid dissolved in methanol into continuous phase consisting of emulsifiers dissolved in tetradecane, aided by ultrasonication. For both emulsifiers, dispersion stability was improved by the addition of the auxiliary emulsifier to the dispersed phase. The new emulsifier showed improved stability compared to the conventional one regardless of the auxiliary emulsifier concentrations. The interaction between the emulsifier and the auxiliary emulsifier at the interface was examined using FT-IR measurements. Shift in C=O stretching vibration peak of the auxiliary emulsifier was observed, suggesting the ion complex formation between the emulsifier and the auxiliary emulsifier at the interface and this contributes the stabilization of the non-aqueous emulsion.

Keywords:

Non aqueous emulsion, Block-random-block type copolymer, Dispersion stability

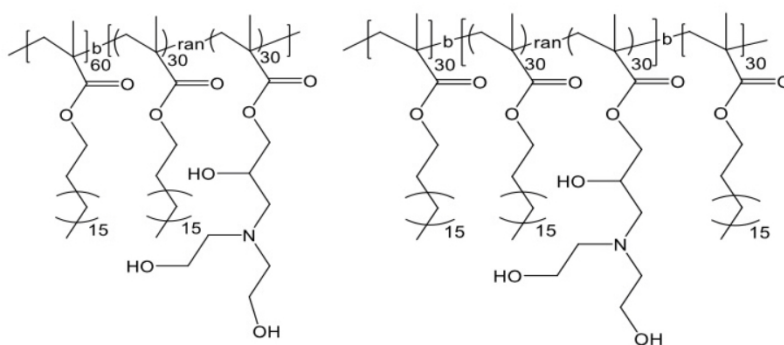


Figure 1 Molecular structure of (A) conventional and (B) novel emulsifiers

References:

[1] A. Imhof, et.al., *J. Colloid Interface Sciencei* , **192** , 368-374 (1997).