PEO-PDMS Block Copolymers at Isooctane/Water Interface – Interfacial Activity and Interfacial Rheology

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The interfacial activity of amphiphilic block copolymers plays a significant role in industrial applications and processes and in biological systems. The main goal of the present work is revealing the structural properties which enhance the interfacial activity as reflected in interfacial tension reduction of isooctane/water interface.

In the present work amphiphilic block copolymers composed of poly(ethylene oxide) as the hydrophilic block and poly(dimethyl siloxane) as the hydrophobic block were examined. The effect of the hydrophobic/hydrophilic blocks sizes ratio on the interfacial behavior was investigated along with the effect of the polymers architecture (diblock copolymers versus triblock copolymers).

An optimal ratio between the hydrophobic/hydrophilic blocks sizes which leads to maximal interfacial tension reduction was found. This phenomenon is explained through interfacial dilatational and shear rheology measurements at isooctane/water interface of these block copolymers.

The interfacial tension reduction and the interfacial dilatational rheology modulus were examined by using pendant drop apparatus combined with pulsating drop modulus (PD100, KSV). The interfacial shear rheology measurements carried out on the magnetic needle rheometer in collaboration with Prof. Jan Vermant, K.U Leuven.