

Link between biaxial elastic modulus and emulsion stability of Nafion ionomers

박수진, 최시영[†]
한국과학기술원
(sqchoi@kaist.ac.kr[†])

Surface active molecules adsorb spontaneously at air-water or oil-water interfaces, forming monolayers, thereby reducing the surface tension. This layer possesses dilatational viscoelastic properties, which determine the behavior of the interface including the mechanical resistance of interface to deformation. Therefore, surfactant molecules are used to stabilize foams and emulsions. We previously observed that Nafion ionomers, sulfonated tetrafluoroethylene based fluoropolymer-copolymer, have high surface activity and stabilize foam and emulsion effectively. To understand it, we observed Nafion monolayer using Langmuir-Blodgett trough. Nafion monolayer was formed at the air-water interface filled with phospholipid molecules by merging a droplet of Nafion solution. This method enables to obtain highly concentrated monolayer and moreover, biaxial compression/expansion can be carried out through surrounded lipid layer. With fluorescence-tagged lipid molecules, formation of Nafion film was observed using fluorescence microscopy and biaxial elastic modulus of the film was measured to find the link between interfacial viscoelasticity with foam and emulsion stability.