

OB_Symp4

Lateral Diffusion of Reconstituted Dialkylviologen Monolayer at the Air/Water Interface Studied with Electrochemistry

Don Keun Lee · Young Soo Kang

Department of Chemistry Pukyong National University

The lateral diffusion of reconstituted alkylviologen monolayer at the air/water interface was studied as a model system of the biomembrane because lateral diffusion of biomembrane molecules has key functions for the life phenomena. The shortest alkyl chain of 1,1'-didodecyl-4,4'-bipyridium dibromide ($C_{12}VC_{12}$) in the subphase of NaCl and NaBr aqueous solutions could not form the stable monolayer, and also does not show any distinct phase transitions. For 1,1'-ditetradecyl-4,4'-bipyridium dibromide ($C_{14}VC_{14}$) and 1,1'-dihexadecyl-4,4'-bipyridium dibromide ($C_{16}VC_{16}$) molecules, the stable monolayer at the air/water interface was obtained and this was identified with pressure-area isotherms and observed at Brewster Angle Microscopy (BAM) images. The orientation of alkyl chain on the viologen molecules was detected by surface potential measurements. From the BAM images, stable monolayer formation, its phase transitions, and collapses of monolayers at the collapse pressure was directly observed. Finally, lateral diffusion of dialkylviologen molecules at the air/water interface was successfully determined with electrochemical techniques using microband electrode. The diffusion constant of viologen molecules at the air/water interface was decreased with decreasing mean molecular area and alkyl chain length of viologen molecules.