

### Reversible photochromic change of polydiacetylene supramolecule by UV irradiation

정윤경, 박경환, 박현규\*

한국과학기술원

(hgpark@kaist.ac.kr\*)

The mechanisms governing the reversible colorimetric transition of the polydiacetylene (PDA) liposome are not clearly understood, but a course of reversible or irreversible chromism of PDA appears to largely depend on the binding forces between dangling headgroups within side chains of the PDA assemblies.[1-3] Our study proposes that the heat-stressed red PDA liposome composed of PCDA (10,12-pentacosadiynoic acid) can present reversible transitions by ultraviolet (UV) re-radiation, in contrast to showing irreversible color transition despite removal of thermal stress factor.[4] By comparing with the PDA liposomes containing different functional groups, it turned out that the photochromic reversibility in the PDA system is largely influenced by the strength of hydrogen bonding between adjacent functional headgroups and UV irradiation seems to play a pivotal role to the backward “red-to-blue” transition. The findings are very meaningful that the PDA colorimetric polymer materials can be easily handled to make various degrees of reversible colorimetric sensors by controlling the intra- and/or inter-molecular forces between headgroups.