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Research Interests

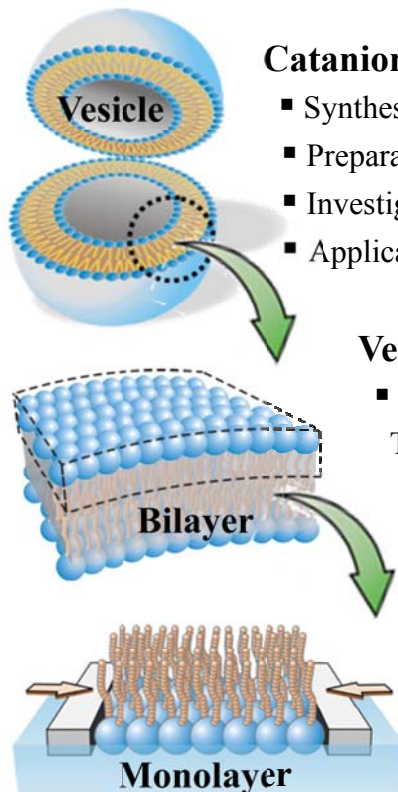
Biomedical engineering
Surface chemistry
Interfacial transport phenomena

Representative Publications

J. Lee and C.-H. Chang, "DNA association-enhanced physical stability of cationic vesicles composed of ion pair amphiphile with double-chain cationic surfactant," *Colloids and Surfaces B: Biointerfaces*, 121, 171-177, 2014.

A.-T. Kuo and C.-H. Chang, "Elucidating the effects of cholesterol on the molecular packing of double-chained cationic lipid Langmuir monolayers by infrared reflection-absorption spectroscopy," *Journal of Oleo Science*, 64, 455-465, 2015.

C.-H. Lee, Y.-M. Yang, K.-L. Leu, H.-Y. Lin, C.-H. Liang, and C.-H. Chang, "Exploring physical stability characteristics of positively charged cationic vesicle/DNA complexes," *Colloid and Polymer Science*, 293, 2239-2247, 2015.



Cationic vesicles

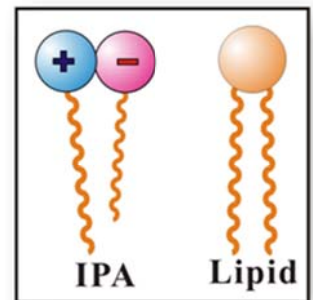
- Synthesis of ion pair amphiphile (IPA)
- Preparations of cationic vesicles
- Investigation of physical characteristics of vesicles
- Applications on drug/gene delivery

Vesicular bilayers

- Analysis of molecular packing within vesicular bilayers
- Tools:
- Fourier transform infrared spectroscopy
 - Fluorescence depolarization measurement
 - Molecular dynamics simulation

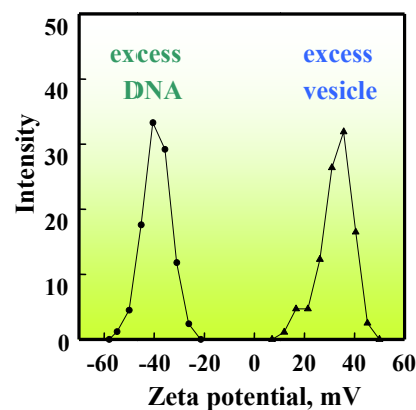
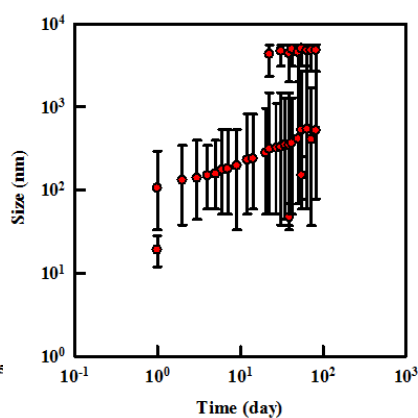
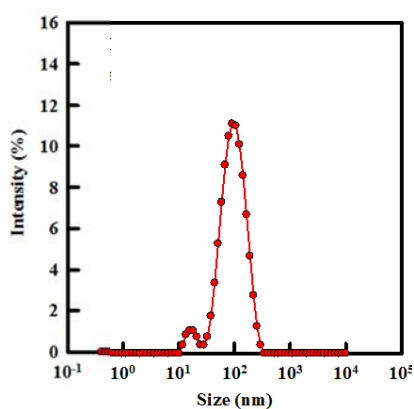
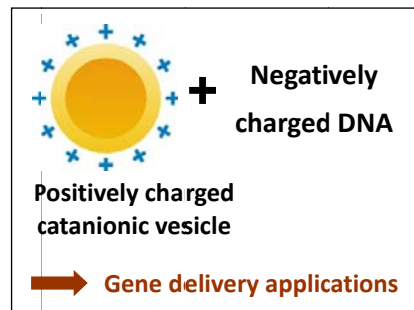
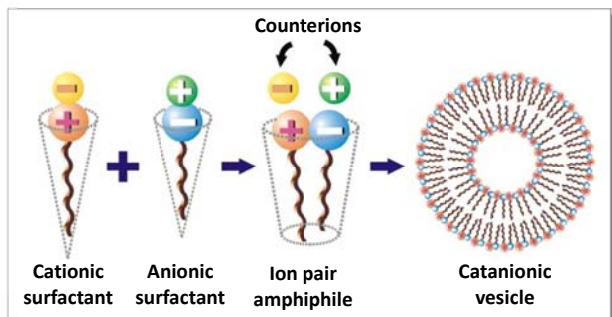
Monolayers

- Analysis of molecular packing and interaction
- Tools:
- Surface pressure-area isotherm
 - Infrared reflection-absorption spectroscopy
 - Fluorescence microscopy



Preparations and applications of charged drug/DNA delivery carriers

Catanionic vesicles with reasonable stability and specific charge characteristics are prepared from cationic surfactants or ion pair amphiphiles with a proper process. Moreover, the feasibility of using the stable cationic vesicles with charges in the gene/DNA delivery applications is examined.

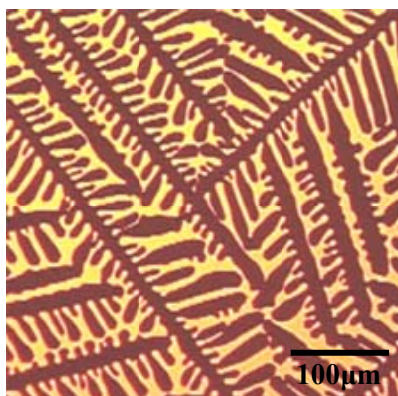


Size distribution and size stability of positively charged cationic vesicles

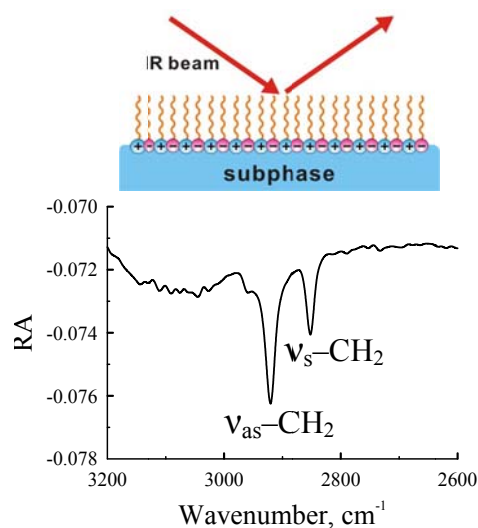
Zeta potentials of vesicle/DNA complexes

Investigation of mixed layer behavior at interfaces

Fluorescence microscopy and infrared reflection-absorption spectroscopy are applied to analyze the monolayer morphology and molecular arrangement at air/liquid interfaces for investigating the molecular interactions in mixed layer systems.



Fluorescence microscopy image of an ion pair amphiphile monolayer at the air/water interface



Infrared reflection-absorption spectroscopy