

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Large Deformation Studies of Vesicles under Electric Fields¹

ROCHISH THAOKAR, PRIYA GAMBHIRE, IIT Bombay — Phospholipids tend to assume various liquid crystalline phases in water. One such phase, the liposome, forms an excellent model to study the properties of the (phospholipid) membranes. Liposomes have been subjected to electric fields and their deformation studied extensively, by various groups. They deform into prolate or oblate shapes based on the frequency of the applied field (alternating fields) or they undergo poration and fusion with the adjacent vesicles. We carry out both experimental and numerical studies on liposome deformation under applied AC electric fields. The small deformation regime agrees with the literature results. We study the deformation modes using high speed imaging. The behavior of liposomes under large field is complicated and dependent upon the properties of the fluids and the lipid membrane. The flow pattern within the medium in the liposome is investigated using flow markers. The large deformations are investigated using the Boundary integral method and comparisons made with the experimental observation. The phase lag between the applied AC field and the deformation response of the membrane is investigated and possibilities of the method as an interfacial rheometer discussed.

¹Department of Science and Technology, India

Rochish Thaokar
IIT Bombay

Date submitted: 22 Jul 2009

Electronic form version 1.4