

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Lamellar to inverted hexagonal phase transition in DNA complexes with calamitic, discotic, and cubic shaped cationic lipids¹ LEI ZHU, LI CUI, Institute of Material Science and Department of Chemical, Materials and Bimolecular Engineering, University of Connecticut, Storrs, CT 06269-3136 — In this study, we report the lipid tail molecular shape/size effect on the mesophase self-assembly of various cationic lipids complexed with double-stranded DNA. The molecular shape of the cationic lipids was tailored from rodlike (a cyanobiphenyl imidazolium salt) to discotic (a triphenylene imidazolium salt), and finally to cubic [a polyhedral oligomeric silsesquioxane (POSS) imidazolium salt]. An increase in the cross-sectional area of the hydrophobic tails with respect to the hydrophilic imidazolium head induced a negative spontaneous curvature of the cationic lipids. As a result, a morphological change from lamello-columnar phase for the DNA-cyanobiphenyl imidazolium salt (DNA-rod) and DNA-triphenylene imidazolium salt (DNA-disk) complexes to an inverted hexagonal phase for the DNA-POSS imidazolium salt (DNA-cube) complex was observed.

¹This work was supported by NSF CAREER award DMR-0348724, DuPont Young Professor Grant, and 3M Nontenured Faculty Award.

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Date submitted: 02 Dec 2006

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