Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Disk, Cylinders, Stack-of-Disks, and Vesicles Morphologies from Amphiphilic Block Copolymer Solution-State Assemblies ZHIBIN LI, ZHIYUN CHEN, HONGGANG CUI, KELLY HALES, KAI QI, KAREN WOOLEY, Washington University in Saint Louis, DARRIN POCHAN, University of Delaware — Disk formation has been examined through self-assembly of poly(acrylic acid)-*b*-poly(methyl acrylate)-*b*-polystyrene (PAA-*b*-PMA-*b*-PS) amphiphilic triblock copolymer with polyelectrolyte PAA as corona block and organic diamines as counterions in water/THF solvent mixtures. It was found that by using the same triblock copolymer but varying the type and amount of diamines, disk or cylindrical micelles could be selectively formed and intermediate structures between discs and cylinders were observed. Under certain solution conditions, disks were prefer to stacking together to form stack-of-disks, and stack-of-disks could also transfer to organized rods by increasing the counterion concentration. Discs within the stacks could be uniform in size, and organized rods had the same geometry while they changed from stack-of-disks. It was interesting to see the long range (microns) interactions between discs or organized-rods. By using diblock (PAA-*b*-PS) copolymer analogues, vesicles were obtained with the presence of diamine counterions. The stability of disc vs. vesicle will also be discussed, and the experimental results will be used to compare with the theoretical predictions. The system was investigated by means of transmission electron microscopy, cryogenic transmission electron microscopy, DLS and SANS.

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Date submitted: 17 Nov 2005 Electronic form version 1.4