Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Dissipative particle dynamics study of relationship between wall thickness and size in polymer vesicles[1] MENGYING XIAO, Nanjing University, Institute of Theoretical and Computational Chemistry, Key Laboratory of Mesoscopic Chemistry, RONG WANG, Nanjing University, Department of Polymer Science and Engineering, State Key Laboratory of Coordination Chemistry, DAIQIAN XIE, Nanjing University, Institute of Theoretical and Computational Chemistry, Key Laboratory of Mesoscopic Chemistry — Vesicles and membrane properties have long been thought to be essential for reproducing the natural environment of living cells. By using dissipative particle dynamics method, we have studied the relationship between wall thickness and size of vesicles obtained from A1BnA1 block copolymers, where block A is hydrophilic and block B is hydrophobic. Our findings suggest that, the wall thickness is sensitive to the size of vesicles at a low block length ratio of B/A, but insensitive to the size at a large ratio. It shows both weak and strong effects with a crossover point in between. These behaviors are consistent with the experimental results of Eisenberg and co-workers. Besides, an additional crossover point also has been observed. With the B/A ratio increases, the relationship goes from strong to weak behavior, and this transformation first appears to affect the outer area for large sized vesicles, and then to the inner area for small sized vesicles. These results may also be useful in delivery applications through controlling the hydrophobic membrane and the hydrophilic coronas.

[1]This work has been supported by NNSFC (Nos. 20874046, 21074053 and 21133006) and NBRPC (No. 2010CB923303).

Mengying Xiao
Nanjing University

Date submitted: 04 Nov 2011 Electronic form version 1.4