

Joint CQSE and CASTS Seminar

Weekly Seminar
May 27, 2016 (Friday)

TIME May 27, 2016, 14:30 ~ 15:30
TITLE Wetting and Instability Studies of Polymer Nanomaterials
SPEAKER Prof. Jiun-Tai Chen
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Abstract

We study the fabrication and characterization of different polymer-related nanomaterials by wetting porous templates. The templates we choose are anodic aluminum oxide (AAO) templates because of the regular pore distribution, high pore density, and high aspect ratio of the pores. Different nanomaterials such as amorphous carbon nanotubes, amphiphilic block copolymer nanotubes, and porous inorganic materials are fabricated by using these templates. Hierarchical polymer nanostructures are also made by wetting the porous template with polymer microspheres or electrospun polymer fibers.

We also develop the solvent-annealing-induced nanowetting in templates (SAINT) using anodic porous anodic aluminum oxide (AAO) templates. In addition, we study the instabilities of polymer nanomaterials under confinement within the cylindrical pores of the template. The instability phenomenon which is driven by surface energy provides a new route for generating novel polymer nanostructures.

References

1. M. F. Zhang, P. Dobriyal, J. T. Chen, and T. P. Russell, *Nano. Lett.*, **2006**, 6, 1075.
2. J. T. Chen, M. Zhang, and T. P. Russell, *Nano. Lett.*, **2007**, 7, 183.
3. K. Shin, S. Obukhov, J. T. Chen, J. Huh, Y. Hwang, S. Mok, P. Dobriyal, P. Thiyagarajan, and T. P. Russell, *Nature Materials*, **2007**, 6, 961-965
4. J. T. Chen and C. S. Hsu, *Polym. Chem.*, **2011**, 2, 2707.
5. J. T. Chen, W. L. Chen, and P. W. Fan, *ACS Macro Lett.*, **2012**, 1, 41.
6. P. W. Fan, W. L. Chen, T. H. Lee, Y. J. Chiu, and J. T. Chen, *Macromolecules*, **2012**, 45, 5816.
7. Y. C. Huang, P. W. Fan, C. W. Lee, C. W. Chu, and J. T. Chen, *ACS Appl. Mater. Interfaces*, **2013**, 5, 3134.
8. M. H. Chi, Y. H. Kao, T. H. Wei, C. W. Lee, and J. T. Chen, *Nanoscale*, **2014**, 6, 1340.
9. J. T. Chen, T. H. Wei, C. W. Chang, H. W. Ko, C. W. Chu, M. H. Chu, and C. C. Tsai,

Macromolecules, **2014**, *47*, 5227.

10. H. W. Ko, M. H. Chi, C. W. Chang, C. W. Chu, K. H. Luo, and J. T. Chen, *ACS Macro Lett.*, **2015**, *4*, 717.

