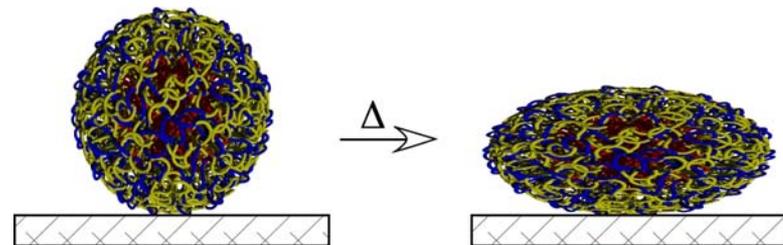


“The Preparation and Characterization of Complex Nanostructured Materials”

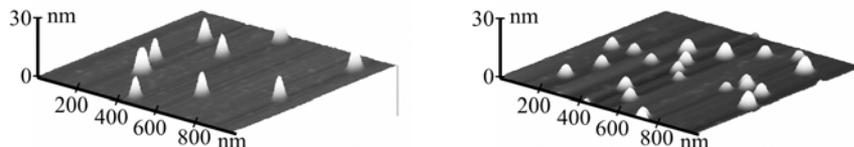
Karen L. Wooley, Washington University in Saint Louis, DMR-9974457

Major Research Accomplishments:

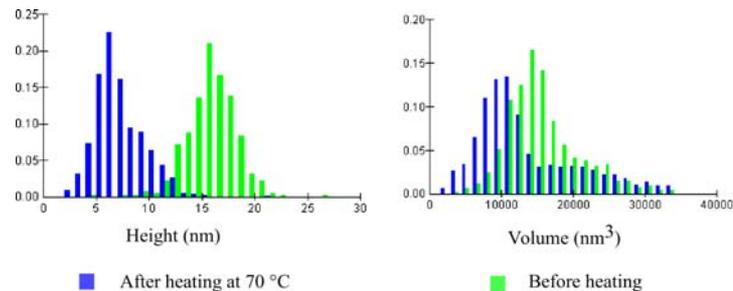
- Advances have been made toward the thermally-driven shape manipulation of well-defined nanostructured materials, originating from the supramolecular assembly of amphiphilic block copolymers.
- The thermal shaping processes are being developed to allow for the preparation of highly complex nanomaterials, which are not accessible by supramolecular assembly protocols alone.
- Murthy, K. S.; Ma, Q.; Remsen, E. E.; Kowalewski, T.; Wooley, K. L. “Thermal Shaping of Shell-crosslinked (SCK) Nanoparticles, Facilitated by Nanoconfinement of Fluid-like Cores”, *J. Mater. Chem.*, in press.
- Huang, H.; Kowalewski, T.; Wooley, K. L. “Nanodroplets of Polyisoprene Fluid Contained Within Poly(acrylic acid-*co*-acrylamide) Shells”, *J. Polym. Sci., Part A: Polym. Chem.* **2003**, *41*(11), 1659-68.



The thermal shaping of shell crosslinked polymer micelles is induced upon a solid substrate.



Atomic force microscopy is used to characterize the thermal shaping of the nanoparticles, as observed in the AFM images before (left) and after (right) heating above the glass transition temperature of the core material.



Measurements of the particle dimensions before and after heating provide histograms as quantitative analyses of the height decrease with maintenance of particle volume, upon thermal treatment.

November 3, 2003

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Broader Impacts:

- Education and outreach have been impacted by the development of a hands-on activities course, which was taught to K-8 grade teachers in the Saint Louis, Missouri region (Fall 2001 and 2003).
- Activities were conducted at Glen Cairn Elementary School, East Lansing, MI, to reinforce the characteristics of chemical changes of matter and methods for the separation of physical mixtures.
- Over the past year, the research activities of three Ph.D. students (Mr. David Germack, Ms. Maisie Joralemon, and Ms. Brooke Van Horn) were supported by this grant, and an REU supplement provided for 2003 summer support to allow for one undergraduate student (Ms. Jasmine Hunt) to participate in research experiences.

