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Theme: Electronic and Magnetic  
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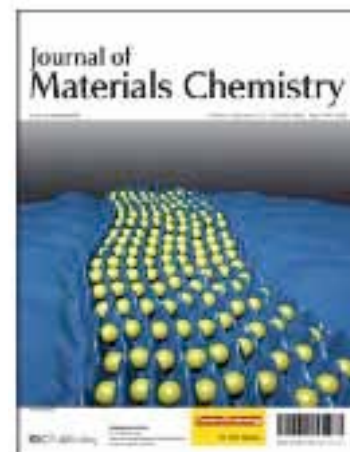
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**Research Summary:**

Our current research focuses on investigations that develop understanding of complex nanoscale processes on surfaces. We aim to decipher and exploit the forces that govern both natural and directed hierarchical self-assembly to create technologically significant surface architectures incorporating electronically or magnetically active materials. Recent studies have included using lithographic patterning to guide the alignment of block copolymer domains, the self-organization of FePt and CdSe nanoparticles on nanostructured polymer films, and the rational design of idealized morphologies for next generation solar energy devices.



**Selected Recent Publications:**

The role of metal nanoparticles and nanonetworks in alloy degradation, Z. Zeng, K. Natesan, Z. Cai, and S.B. Darling, *Nature Mat.*, **7** 641-646 (2008).

Isolating the effect of torsional defects on mobility and band gap in conjugated polymers, S.B. Darling, *J. Phys. Chem. B*, **112** 8891-8895 (2008).

Directing the self-assembly of block copolymers, S.B. Darling, *Prog. Polym. Sci.*, **32** 1152-1204 (2007). **[Invited Review]**

Hybrid nanomaterials from hierarchical self-assembly of nanoparticles and clusters on diblock copolymer films, S.B. Darling, A. Hoffmann, N.A. Yufa, S.D. Bader, and S.J. Sibener *Polym. Mater. Sci. Eng.* **96** 31-32 (2007).

Tuning the self-assembly of metal nanoclusters on diblock copolymer templates, S.B. Darling and A. Hoffmann, *J. Vac. Sci. Technol. A*, **25** 1048-1051 (2007). [Selected for July 16, 2007 issue of *Virtual Journal of Nanoscale Science & Technology*]

Mechanism for hierarchical self-assembly of nanoparticles on scaffolds derived from block copolymers, S.B. Darling, *Surf. Sci.* **601** 2555-2561 (2007). **[Invited]**