Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Directly Patterned Mesoporous Carbon and Metal-Doped Carbon Films Prepared using Block Copolymer Templates in Supercritical CO2 GAURAV BHATNAGAR, JAMES WATKINS, University of Massachusetts - Amherst — Porous carbon and metal-doped porous carbon films have wide applications in separations, sensors, catalysis and magnetic storage applications. Conventionally prepared carbon films have micropores in the size range of 2 nm. Recent techniques for the synthesize of mesoporous carbon with 10-50 nm pores using sacrificial silica templates have limitations with respect to pore connectivity and the preparation of patterned and metal-doped carbon films. Here we report supercritical fluid-assisted infusion and phase selective reaction within pre-organized block copolymer and block copolymer/homopolymer templates to synthesize mesoporous carbon and metal doped carbon films. Well-defined mesoporous carbon films patterned at the device level with good mechanical properties and metal doped carbon films by pre-infusion of block copolymer templates with metal precursors in supercritical carbon dioxide were synthesized. Platinum doped carbon films for applications in fuel cells having good electrochemical response were produced. The preparation of cobalt containing carbon films with potential use in magnetic storage applications demonstrates the general applicability of supercritical infusion technique to produce metal cluster containing films.

Gaurav Bhatnagar
University of Massachusetts Amherst

Date submitted: 30 Nov 2005 Electronic form version 1.4