**508e Hydrothermal Synthesis and Deposition of Iron Oxide Nanoparticles in Activated Carbon**

*Amyn S. Teja and Chunbao Xu*

This work describes the use of supercritical water to synthesize and deposit iron oxide nanoparticles on the surface and in the pores of activated carbon (AC). The high diffusivity and low surface tension of supercritical water, together with the elimination of interphases, was employed to facilitate rapid diffusion of reactants into the pores as well as rapid nucleation and growth at supercritical condtions. This leads to reaction and deposition rates that are several orders of magnitude higher than those obtained using traditional methods of catalyst preparation. The effects of immersion time, reactant concentration, and residence time on particle size and particle distribution on activated carbon were investigated. The synthesized composites were characterized by x-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive x-ray spectroscopy (EDS), and transmission electron microscopy (TEM). Our results show that two types of distributions (uniform and egg-shell) of *f*Ñ-Fe2O3 nanoparticles in activated carbon can be achieved by controlling synthesis parameters. The unique advantages of the supercritical process over traditional methods of impregnation are described.