Porous, Hollow, and Ball-in-Ball Metal Oxide Microspheres
An inexpensive ultrasonic generator was used to synthesize porous, hollow, and ball-in-ball metal oxide microspheres. The morphology and pore size were controlled by the silica to Ti IV ratio and the silica particle size. With the introduction of transition-metal ions, core/shell-type microspheres can be synthesized in a single-pot synthesis. These nanomaterials are rapidly taken up into the cytoplasm (but not into the nucleus) of macrophages and show very little cell toxicity.