Invention Available for Licensing *Nanomaterials*

Title: ***Micro- and Nano-Particles with Variable Surface Morphologies***

UMB14-06

Inventors: ***Martin Thuo and Ian Tevis***

Applications:

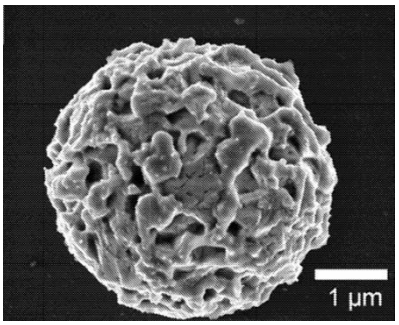
- Useful as contrast agents or drug delivery
- Substrate for multiple catalysts for multi-step reactions

Benefits:

- Increased surface area can accommodate multiple catalysts or payloads
- Low mammalian toxicity due to use of nontoxic metals
- Easy to scale up using existing industrial equipment, resulting in reduced production costs

Technology Description: The invention comprises multilayer particles having an irregular surface architecture, and methods of making such particles. The invention makes use of centrifugal shearing forces to form nanoparticles from liquid metals, as has also been done for related invention UMB14-03. In the present invention, two or more different metals in the shear-created nanoparticles are subjected to phase separation, which gives the surface of the nanoparticle a variety of non-smooth morphologies. Such patchy surfaces can also be derived by selective etching of the nanoparticles (i.e., selective removal or modification of the different metal components based on their differing chemical or physical properties), to give particles of different sizes and shapes. The particles created by this method have a novel, irregular architecture and are multi-layered and patchy, with different degrees of surface roughness, dictated by the phase separation process and the cooling rate. The particles are easy to regenerate, and feature increased surface area to enable coating with multiple catalysts or therapeutic payloads from a single alloy.

Patent and Publication Status: UMass Boston is the owner of an allowed U.S. patent application on this invention. The research underlying the invention has been published as Tevis, et al., *Langmuir* 2014 30:14308–14313.



An SEM image of a variable-surface particle made in accordance with one method of the invention.

For more information:
David J. Glass, Ph.D.
University of Massachusetts Boston
Office: 617-287-5710
Cell: 617-653-9945
david.glass@umb.edu