UMASS BOSTON

Invention Available for Licensing Nanomaterials

Title: ***Core-shell Multi-layered Micro and Nanoparticles***

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Applications:

- Useful as contrast agents or drug delivery
- Substrate for multiple catalysts for multi-step reactions
- Coatings for mirrors, LEDs

Benefits:

- Low mammalian toxicity due to use of nontoxic metals
- Easier to scale up using existing industrial equipment
- Reduced production costs

Technology Description: This invention features innovative methods of making core-shell micro- and nanoparticles, specifically three-layered particles which can be further developed into multi-layers through chemical grafting of the outer layer. The core-shell particles feature a soft, liquid metal core comprised of a nontoxic metal like gallium-indium, at least one layer of inorganic material such as an oxide surrounding the liquid metal core, and at least one layer of organic material attached to the layer of inorganic material. In an improvement over the prior art, the particles are produced not by sonication, but by centrifugal shearing forces followed by oxidation and reaction of the surface oxides with organic molecules to give the three layered structure. The shearing forces can be fine-tuned to give particles of different sizes and shapes, as may be required for different commercial applications.

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

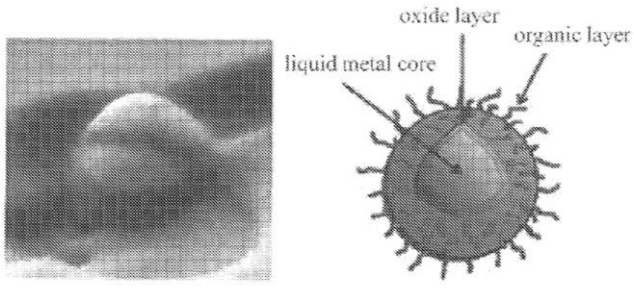

FIG. 11

An SEM image and a schematic of an etched core-shell particle in accordance with this invention.

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