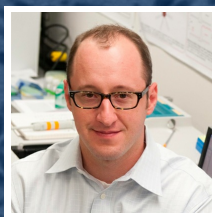


Merging Chemistry and Nanotechnology



Mathew Maye
Associate Professor, Department of Chemistry

CURRENT RESEARCH

Using chemical structures of nanoparticles to organize more precise materials

Everyday we interact with and benefit from things unforeseen: nanomaterials arranged for computer chips, High Definition televisions, and automatic sensors like smoke detectors are but only some of them. In the age of technology where the smallest-scale matter can be manipulated to serve an intended purpose, nanotechnology is changing the way we travel, purify water, and treat diseases, to name a few. Dr. Mathew Maye, a materials chemist at Syracuse University, uses chemistry to prepare nanoparticles that have new compositions, optical properties, and energy transfer ability. His team's state-of-the-art ability to control structure, composition, and properties of nanomaterials allows them to craft synthetic designs so that they can fine-tune properties, and create precise, designer applications.

The properties of materials change as they are prepared at nanoscale levels. Gold turns color to red, semiconductors emit bright visible colors, and materials like oxides (think sunscreen) see big improvements in reactivity. To alter these properties at the nanoscale level, Dr. Maye uses chemistry to prepare nanomaterials with precisely controlled sizes, shapes, and compositions, with an eye towards improving performance in catalysis, lighting, fuel cells, batteries, and solar cells. To accomplish this, Maye and his team first brainstorm and find challenges in the field, and then work out the new chemistry or nanoscience required. For example, when working in energy transfer, they synthesize the exact quantum dots required by using chemistry to tailor composition, structure and morphology. When working in bio-inspired self-assembly, they attach DNA to quantum dots to perform a programmed function. When preparing a...

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AFFILIATION



EDUCATION

- Postdoctoral Fellow in Center for Functional Nanomaterials 2008, Brookhaven National Laboratory
- Ph.D. in Chemistry 2005, SUNY Binghamton
- B.S. in Chemistry 2001, SUNY Binghamton

AWARDS

- Department of Defense Presidential Early Career Award For Scientists and Engineers (PECASE) award, 2010-2015
- Technologist of the Year, awarded by Central New York Technology Alliance, 2013
- DOE Gordon Battelle Prize, co-recipient, 2011
- Goldhaber Distinguished Fellowship, Brookhaven National Laboratory, U.S. Department of Energy (05-08)
- Department of Defense: National Defense Science & Engineering Graduate Fellowship (NDSEG) (Chemistry, 2002-05)

RESEARCH AREAS

Technology, Chemistry, Materials Science / Physics, Nanotechnology

FUNDING REQUEST

Your contributions will help support the research of Dr. Mathew Maye of Syracuse University as he continues to develop novel ways to prepare and assemble nanomaterials. Your donations will help provide supplies, sample analysis, instruments, as well as support personnel. Over the past six years the team has become well established in the field, and their projects have produced three patent pending applications and one patent award.