Harnessing the Immense Power of Computers

Susan Sinnott

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CURRENT RESEARCH

Using computers to provide insights and discoveries of new materials

Using the power of modern computers to apply the laws of physics to design and investigate materials is a giant step ahead of the traditional approach. Usually researchers have to produce the metal alloy or polymer composite, test it, tweak the production, and then repeat, until the desired properties are obtained. Dr. Susan Sinnott, Head and Professor of Materials Science and Engineering at The Pennsylvania State University, utilizes the predictive power of computers to discover, investigate, and design materials alloys. The computational methodology her team is developing is unique in the field, allowing them to speed up material development for all kinds of applications that are important for modern life, such as lithium-ion batteries, the processors that power computers, the strong yet light materials out of which cars are made, and metal alloys that can function at extremely high temperatures. Dr. Sinnott's computers also provide a window into behavior of nanomaterials that is still challenging to observe with experimental (lab) equipment. The software, as it's developed, is offered to the science community as free shareware, so that it can be used by others to advance research at a much quicker pace.

- Dr. Sinnott's team is working to understand the way in which technologically important coatings grow in plasma chambers, which are also used in processing silicon chip wafers. The simulation results produce movies where they can watch every atom and see how each one contributes to the growing film! This insight is unattainable experimentally and helps the collaborators improve the conditions in their plasma chamber to improve the film properties.
- They are also examining the...

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AFFILIATION

Pennsylvania State University

EDUCATION

- Ph.D. in Chemistry 1993,Iowa State University
- B.S. in Chemistry 1987 ,University of Texas, Austin

AWARDS

- Fellow of the American Physical Society (2013), Materials Research Society (2012), American Ceramic Society (2011), American Association for the Advancement of Science (2010), and the American Vacuum Society (2005)
- University of Florida Research Foundation Professor, 2011-2013
- University of Florida College of Engineering Doctoral Dissertation Mentoring Award, 2009

RESEARCH AREAS

Technology, Computational Sciences / Mathematics, Materials Science / Physics, Nanotechnology

FUNDING REQUEST

Each of Dr. Sinnott's projects range from $50-$100K. Your donations would help her team complete the investigation into inorganic nanostructures and obtain significant new insights within one year. Your contributions would also fund her research into the properties of coatings deposited through plasma, with important findings just 2-2 ½ years away. Contribute today and help create the materials of the future!