

# Smart Materials & Structures

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### Recent advancement of renewable smart materials

Sustainability is essential in future technologies to harmonize with our living environment. Renewable materials can maintain our resources from the environment so as to overcome degradation of natural environmental services and diminished productivity. Cellulose is one of the nature's most abundant natural polymers, the main chemical components of wood and plants. It is a renewable material that recycles to nature by composting with short period of time. The use of renewable materials is essential in future technologies. This presentation reviews recent advancement of renewable materials for smart material applications, including cellulose and its sensors, actuators and energy storage applications. To further improve functionality of renewable materials, hybrid composites of inorganic functional materials are introduced by incorporating carbon nanotubes, titanium dioxide and tin oxide conducting polymers and ionic liquids. Since renewable materials have many advantages of biocompatible, sustainable, biodegradable, high mechanical strength and versatile modification behaviors, more research efforts need to be focused on the development of renewable smart materials.

### Biography

Jaehwan Kim has joined the Department of Mechanical Engineering at Inha University, Korea in 1996, where he serves as Inha Fellow Professor. He is a Fellow of The Korean Academy of Science and Technology, National Academy of Engineering of Korea and Institute of Physics. He is an Associate Editor of Smart Materials and Structure as well as Smart Nanosystems in Engineering and Medicine and Editor of *International Journal of Precision Manufacturing and Engineering and Actuators*. He has been the Director of Creative Research Center for EAPap Actuator. Recently, he has started another Creative Research Center for Nanocellulose Future Composites. He has first discovered cellulose as a smart material, which can be used for sensors, actuators and electronic materials. His research interests are smart materials, structures and devices; biomaterial based smart materials, cellulose, electroactive polymers, power harvesting, biomimetic actuators, biosensors, tactile sensors and flexible electronics. He has published more than 250 prestigious journal papers, 280 international conference papers, more than 30 patents.

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