Journal of Nanotechnology and Materials Science

OMMEGA Publishers
Answering Intelligence
www.ommegaonline.com

Editorial Letter

Viewpoint of Nanotechnology and Material Science

Kenji Uchino*

Electrical Engineering, International Center for Actuators and Transducers, The Pennsylvania State University, USA

***Corresponding author**: Uchino, k. International Ctr. for Actuators & Transducers, The Pennsylvania State University, University Park, PA 16802, USA, E-mail: kenjiuchino@psu.edu

Received Date: Dec 19, 2014
Accepted Date: Dec 24, 2014
Published Date: Dec 28, 2014

Citation: Uchino, k. Viewpoint of Nanotechnology and Material Science. (2014) J Nanotech Mater Sci 1(1): 36.

Editorial

"Journal of Nanotechnology and Material Science" is an open access, peer reviewed journal with a sole intention of promulgation of research articles throughout the globe. Open access model provides the scientists and researchers a platform to share their innovations, discoveries and findings thus removing all the barriers that were imposed in traditional publishing models.

I am delighted to write an editorial message for this new edition as one of the journal's Editorial Board Members. This edition is an omnibus of various areas,1) Indium-free amorphous oxide semiconductor, 2) carbon nano tubes, 3) oxide ferroelectrics, and 4) virosome of unilamellar phospholipid membrane. Using this opportunity, Iwould like to discuss the necessary strategies, which the materials research engineers need to keep in their minds in these decades, which are already exemplified in this issue. Though you might have already read my previous articles[1-3], I dare to repeat my opinion for wider materials-science readers from a different angle.

I have been a so-called "Navy Ambassador to Japan" (officially Associate Director at Asia Office of the US Office of Naval Research) in these four years until July this year. I had chances in deep involvement in setting multipleinternational R&D related agreements between the US Department of Defense and Japanese governmental institutes, including the rescue technology projects relating with the Big Earthquake and consequent Fukushima Daiichi Nuclear Power Plant melt-down in 2011.

During these diplomatic work tasks, I confirmed the urgent necessity of politically initiated technology development. Historically, the Japanese government set the four-Chinese-character slogan for encouraging the researchers along a particular direction. "heavier, thicker, longer, and larger"was the first one in 1960s, aiming at the infrastructure recovery from the WWII ruins.A completely opposite slogan, "lighter, thinner, shorter, and smaller", started in 1980s, for strengthening the country economic power. I started my compact piezoelectric actuators for micromechatronic applications in the late 1970s under this trend.

I would like to propose a new four-Chinese-character keyword for the new 21st century era, "cooperation, protection, reduction, and continuation". International cooperation-and global collaboration in standardization of internet systems became essential to accelerate the mutual communication. The US-Japan Agreement in the "Rescue Robot" development for crisis occasions is one of the urgent tasks which I was involved. The Kyoto Protocol in December 1997 was a trigger to more wide international agreements linked to the United Nations Framework Convention on Climate Change in order to reduce greenhouse gas emission. This is a symbolic global regime for determining the materials' research direction in the 21st century. Accordingly, I am proud to announce that my invention "multilayer piezoelectric actuator" became one of the key technologies for reducing NO_x or SO_x in recent diesel engine automobiles.

Protection of the territory and environment from the enemy or natural disaster, and of infectious disease spread is mandatory. In addition to terrorist attacks, HID, Bird Flu and in particular EBOLAare now the worldwide headache. How can our materials be applied for these aims. Bio materials or medicine development is highly required. Reduction of toxic materials such as lead, heavy metals, dioxin, and of the use of resources and energy consumption is also the key, and the society continuation (i.e., status quo or Sustainable Society) is important to promote.Even in my research area, the long-term material champion, PZT, may be regulated in several years by RoHS (Restriction of Hazardous Substances Directive) due to Pb (lead) inclusion. I recognize various toxic compounds such as Indium Gallium Arsenideeven in semiconductor materials. Thus, the current material researchers need to seek alternative materials (environmentally friendly materials) for replacing toxic ones.Bio/medical materials such as hormones are important to develop, but their disposal way should also be seriouslyconsidered not to harm the environment. The material related with renewable energy generation is also the "must" for reducing nuclear power plants.

As a concluding remark, Uchino's recommendation is to learn global and domestic regimes/political strategies for 10 years ahead, and to reflect the materials development according to this direction.

References

1.Uchino, K. "Politico-Engineering–Politically-Initiated Engineering in Piezoelectric Devices". (2013) SOJ Materials Science & Engineering 1(1): 10.

2.Uchino, K. Piezoelectric Actuator Renaissance. Proc. 14th Int'l Conf. (2014) New Actuators, Bremen, Germany p: 37.

3.Uchino, K. "Piezoelectric Actuator Renaissance". (2014) J Energy Harvesting and Systems 1(1-2): 45–56.