

## **Strategy for Nanotechnology and Materials Research at National Institute for Materials Science**

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### **Abstract**

NIMS was established in 2001 and it is the sole Independent Administrative Institution (IAI) in Japan, specializing in materials science. Research at NIMS are focusing on "Nanotechnology-driven Materials Science for Sustainability". Based on this concept, we have categorized R&D regions, into "Nanotechnology-Driven Advanced Materials Research" and "Advanced Materials Research for Social Needs" with 20 projects in these areas, including nano electronics, new materials exploration for future and practical application. All of us at NIMS are committed to the concept that materials research holds enormous potential for technical innovation in a wide range of industries.

Especially in "Nanotechnology-Driven Advanced Materials Research" with the aim of achieving world-level pioneering technical innovation by the creation of precursors for basic research in nanotechnology and novel materials, NIMS is engaged in fundamental research and development of materials utilizing nanotechnology, including the development of advanced common infrastructure technologies such as measurement, analysis, and modeling techniques related to nanotechnology, creation and structural control of novel substances at the nano scale and the search for novel functions, development of practical materials for the future nano electronics. Practically NIMS has been promoting materials research for future gate stack materials, such as high-k dielectric, metal gate materials and their interface controlling. Also for the beyond CMOS age, atomic switching device and its application to field gate array was demonstrated. As optical interconnections, optically pumped nano laser was fabricated on Si to merge with Si CMOS devices.

In the research on "Advanced Materials Research for Social Needs", NIMS is involved in fundamental research & development of advanced environmental and energy materials to realize the infrastructure with reduced environmental and energy loads.

NIMS is now promoting international collaboration based on "Comprehensive Research Cooperation" and "Memo random on Understanding". To accelerate such collaboration and intermixing with foreign researchers, NIMS has been organized the International Center for Young Scientist (ICYS), where the English is the official language and melting pots situation is provided for various researchers from oversea countries.

In this talk, I would like to introduce some of these NIMS activities in nanotechnology and nano electronics with several examples.