



# FIRST INTERNATIONAL NANOTECHNOLOGY CONFERENCE ON COMMUNICATION AND COOPERATION

## Abstract

### **Minimal Manufacturing: Toward Sustainable Industrial Society enabled by Nanotechnology**

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“Sustainability” is the ultimate requirement facing all industrialized societies in the world in the 21st century. Given the ever increasing oil prices today, even ordinary people are inevitably forced to become keenly aware of quickly depleting fossil fuels and other natural resources in their daily life. Global climate changes and recent tragic disasters are adding another pressing concern. Nanotechnology, as an ultimate materials science and technology to revolutionize how things are made, should address those issues and provide feasible solutions. We coined the term “Minimal Manufacturing” to refer to the optimized manufacturing system in which least possible energy, materials, time, and human labor are expended inasmuch as natural laws allow. We made a foresight plan in AIST to focus our R&D efforts in nanotechnology into the realization of minimal manufacturing. Not a single breakthrough is not enough to such a structural change, but we must intentionally and coherently integrate elemental developments. On-demand processes such as those made possible by inkjet printing is a good example to illustrate how the existing “resource consuming” chip industry may be restructured in an environmentally more compatible form. Less energy consuming devices using spintronic materials or liquid crystal displays with nanofabricated memory capability offer further to show how nanotechnology can make a difference. This talk gives an overview of our minimal manufacturing programs.