

# The 275<sup>th</sup> MANA Seminar



Research and Development work at NPL, New Delhi on metal-matrix composites reinforced with carbon nanotubes and BN nanotubes

Chair: Dr. Yoshio Bando (MANA COO)



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The Physics and Engineering Division of the NPL is actively engaged in the development of advanced carbon materials such as carbon fiber, C-C composites, single walled and multiwalled carbon nanotubes and their application in the fabrication of metal/polymer/ceramic matrix composites for structural and energy applications for the last more than 3 decades. My talk at NIMS will mainly be focused on the R&D work carried out at NPL, on the development of Al and Cu matrix composites reinforced with CNTs/BNNTs using powder metallurgy process. One of the major challenges in the fabrication of these composites is to obtain a homogeneous dispersion of CNTs/BNNTs in metal matrix. Thus efforts have been made to functionalize CNTs or BNNTs. A high energy ball milling in an inert atmosphere was used to obtain a homogeneous mixture of metal and nanotubes. The functionalized CNTs and BNNTs were characterized using SEM, FTIR, Raman spectroscopy and SIMS and the various mechanical properties of the metal-matrix composites were measured using a Universal Instron machine. The interfacial bonding between the metal and CNTs/BNNTs was studied using HRTEM. These composites could be used by aerospace and automobile industries where lower weight and higher strength materials are desired. Some issues on the synthesis of BN nanotubes and nanosheets will also be presented.

**Venue: Auditorium, 1F, WPI - MANA Bldg.,**

**Date: July 13<sup>th</sup>, Friday Time: 15:30-16:15**

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