

# **Carnegie Mellon**

## **Materials Science and Engineering Seminar Series**

*Materials Research at Carnegie Mellon*

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#### **“Microstructural Evolution of annealed Cu-Nb Composite – *Size Matters*”**

**Friday, February 15, 2008**

**11:30 A.M. Seminar in Baker Hall A51**

*Refreshments precede seminar at 10:30 A.M. in 2325 Wean Hall*

Composites are of interest because of the novel properties that one can obtain from combining different materials. Research on metal-metal composites has grown in recent years with a particular focus on the question of length scale effects in such composites. It has been reported that composites comprising two base metals that each have strengths in the range of a few hundred MPa may attain strengths of several GPa as the interfilamentary spacing is reduced down to the nano-scale, far exceeding the prediction of the rule of mixtures. This showed that “size does matter” for the aspect of strength. Such research has made these composite materials attractive for a number of potential structural applications as well as in areas where there is a need for materials having high strength and conductivity. Inasmuch as the strength of such two-phase composites motivates studies of such composites, the annealed microstructure and texture of these composite needs to be studied and investigated because these composites may be subjected to heat treatment, either during their processing, or as a consequence of their usage, as in the application in magnetic coils through Joule heating. There is very little investigation into texture evolution of the annealing of such composite and none that correlates the development of microstructure evolution of annealed composites with respect to layer thickness. Accordingly, we investigate the length scale effect of layer thickness on the microstructural evolution of annealed Cu-Nb “lamellar/layered” composite. We will focus exclusively on the copper layers in the layered composite and will qualitatively and quantitatively show the major texture components in the as-rolled and annealed condition. In this presentation, we would like to show how size does matter also for the recrystallization and texture evolution of the Cu layers in such composites.

Samuel received his Bachelors and Masters (Mechanical Engineering) from National University of Singapore, in 1999 and 2001 respectively. He worked in Singapore Institute of Manufacturing Technology (SIMTech) till 2003. He obtained a scholarship from the Agency of Science and Technology Research (A\*STAR), Singapore for his Ph.D study in 2003 and obtained his Masters (Materials Science) from Carnegie Mellon University in 2005. He is currently a Ph.D. candidate under the guidance of Prof. Anthony Rollett.