

# Carbon Nanotube Growth Using Ni Catalyst in Different Layouts

H.Q. Nguyen<sup>1</sup>, R.Krishnan<sup>2</sup>, K.W.Choi<sup>1</sup>, C.V Thompson<sup>2</sup>, F.Y.Lim<sup>3</sup>

1. Advanced Materials for Micro and Nano-systems, National University of Singapore, Singapore-MIT Alliance, Singapore.
2. Department of Materials Science & Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA.
3. Institute of Materials Research and Engineering, Singapore.

**Abstract** – Vertically aligned carbon nanotubes have been grown using Ni as catalyst by plasma enhanced chemical vapor deposition system (PECVD) in various pre-patterned substrates. Ni was thermally evaporated on silicon substrates with anodized alumina mask prepared in different methods including 2 step anodization of porous alumina template and interference lithography assisted array of pores. The templates helped to define Ni nanodots inside the pores which in turn catalyzed the growth of carbon nanotubes inside the PECVD system at temperature of 700-750C using mixture of ammonia and acetylene gases. The resulting well-aligned multi-walled carbon nanotubes were further investigated using SEM, TEM and Raman spectroscopy. The size, shape and structure of the grown carbon nanotubes were also discussed.