

Supporting information for “Carbon nanotube diameter control via catalytic Co nanoparticle electrodeposited in porous alumina membranes”

N. J. Ke,^a A.J. Downard^{a*} and V.B. Golovko^{a*}

^a The MacDiarmid institute for Advanced Material Nanotechnology, Department of Chemistry, University of Canterbury, Private bag 4800, Christchurch 8041, NZ

* A.J Downard: alison.downard@canterbury.ac.nz

*V.B. Golovko: vladimir.golovko@canterbury.ac.nz

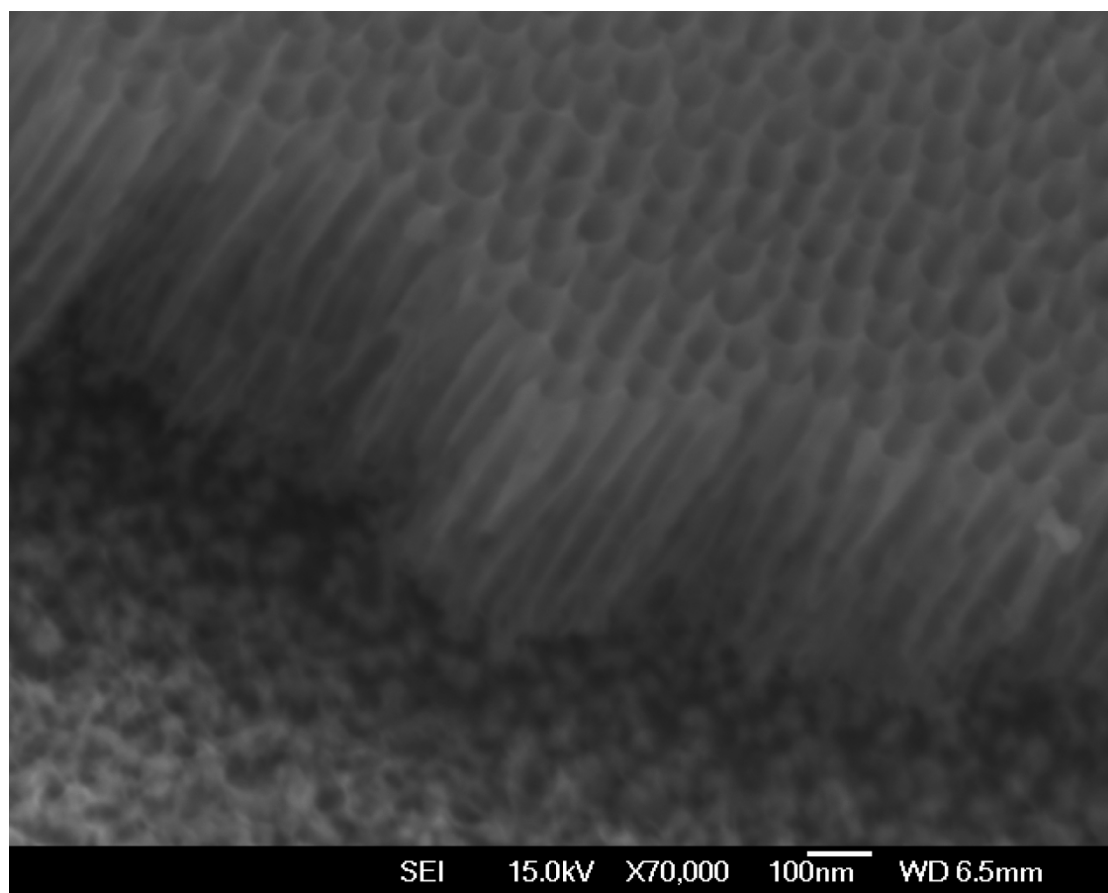


Fig. S1. SEM image of a cross-section of a PAA template which was prepared using the optimized anodization and etching process followed by Co electrodeposition (1.6 s at pH 3.8). The sample was then washed and heat-treated in the tube furnace to replicate the reduction process preceding CVD growth of CNTs (1 h at 450 °C followed by ramping up to 650 °C under a H₂ containing atmosphere, but without the carbon feedstock gas).

Monitoring of the voltage pulses at the electrodes during electrodeposition of Co

The yellow line (Fig. S2) shows the applied voltage waveforms at the working electrode during 6 electrodeposition steps. The blue line shows the voltage at the auxiliary electrode as the current passes through the PAA template and the Co(II) electrolyte. Fig. S3 shows that the voltage at the auxiliary electrode gradually decreases during each electrodeposition interval indicating that the PAA template becomes less conductive with an increase in the number of electrodeposition intervals.

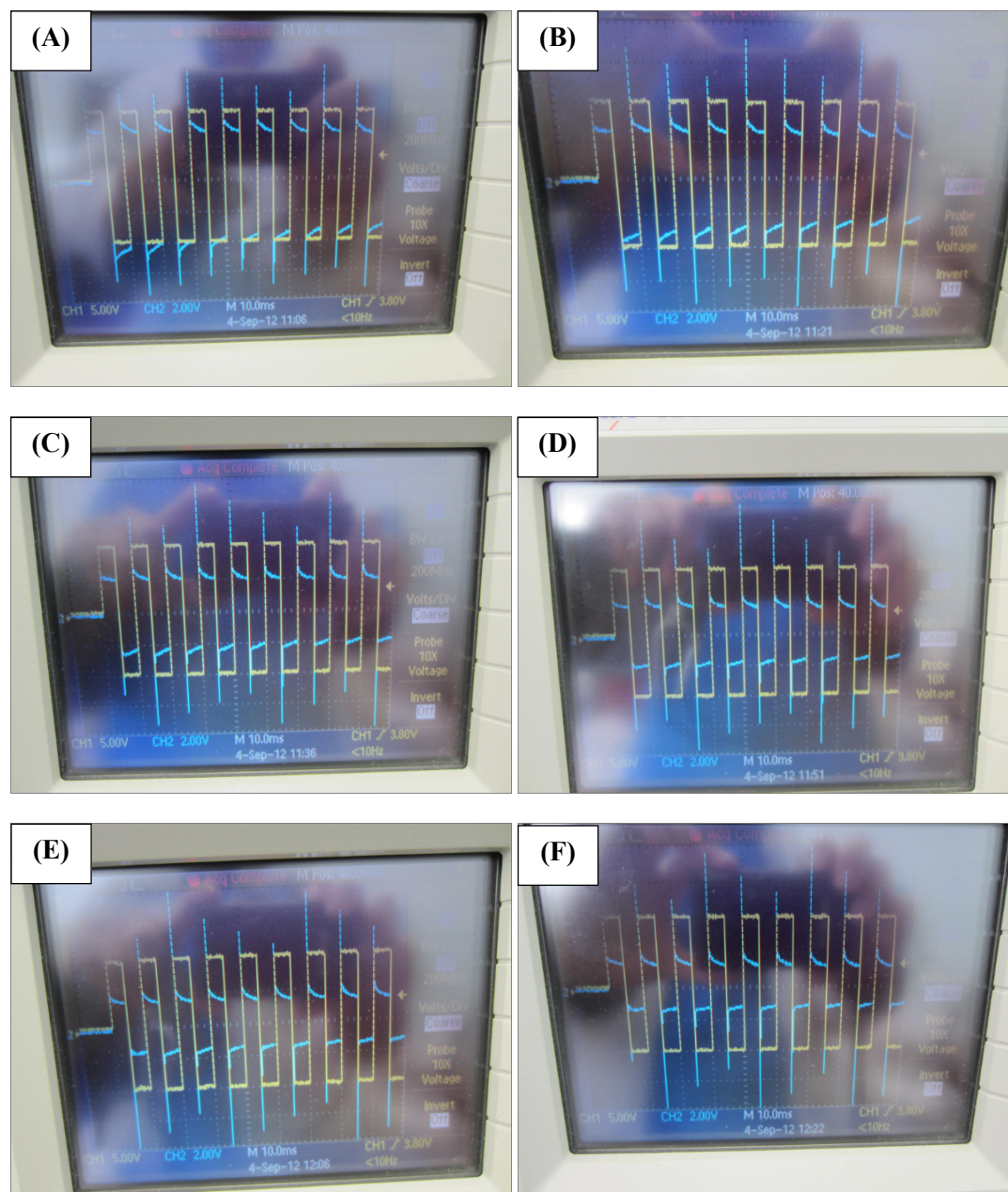


Fig. S2. Photos of the oscilloscope screen used for monitoring the pulsed voltage during the electrodeposition of Co. A-F: 1st - 6th electrodeposition steps. Electrodeposition time is 100 ms for each step. Yellow line shows the applied voltage and the blue line shows the voltage measured at the auxiliary electrode.

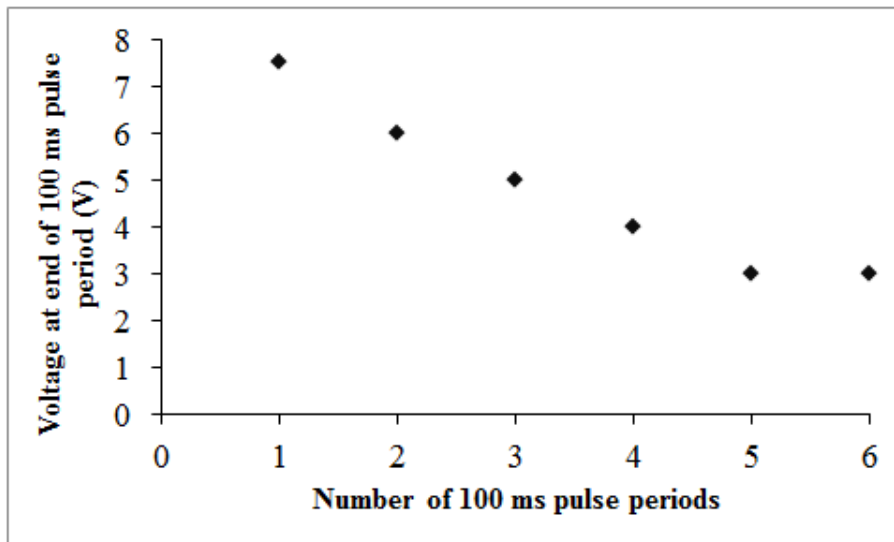


Fig. S3. Plot showing the measured voltage at the electrodes at the end of 100 ms pulse periods (applied amplitude = +/- 10 V, frequency = 100 Hz) vs the number of 100 ms pulse periods (15 min rest interval between pulse periods).