Supporting information:

Reversible Gating of Ion Transport Through DNA-Functionalized Carbon

Nanotube Membranes

Samaneh Shadmehr, Michael Coleman, Biwu Liu, Juewen Liu, Xiaowu (Shirley) Tang*

Department of Chemistry & Waterloo Institute for Nanotechnology (WIN)

University of Waterloo, 200 University Ave West, Waterloo, Ontario, Canada, N2L 3G1.

1- Length of As-grown CNTs measured using SEM

The sample was prepared by cutting across a large area of CNT forest grown on a Si substrate.



Figure S1: SEM image of vertically aligned CNTs on a Si substrate.

2- Calibration curve for DPV current vs. ferricynide concentration



Figure S2: Calibration curve for differential pulse voltammetry (DPV) measurement of ferricynide ion concentration.

3- Fluorescence microscopic confirmation of ssDNA grafting on CNT membranes



Figure S3: Transmission white-light (a) and Fluorescence microscopy (b) images of a CNT membrane after conjugation of ssDNA (Cy3-labelled, amine-modified) onto the CNT tips.

4- Fluorescence spectra of permeate solution



Figure S4: Fluorescence spectra of permeate solutions 48 hours after ssDNA (red) and cDNA (blue) functionalization (in the feed reservoir) confirmed that DNA transport across the CNT membranes is negligible. As a reference, the fluorescence spectrum of 10 nM Cy3-labelled ssDNA shows a clear peak around 565 nm.

5- HR-TEM images showing structural blockage in a small percentage of MWNTs



Figure S5: HR-TEM images of multi-walled carbon nanotubes show example structural defects causing blocked CNT channels.