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Ionic currents through individual carbon nanotubes CHRISTINE MEYER, MARC ZUIDDAM, VISHAL MERANI, JEROEN DE GREBBER, CEES DEKKER, Kavli institute of nanoscience, Delft University of Technology, The Netherlands — The miniaturization from microfluidic to nanofluidic channels is a growing field of research. Many new effects are predicted and observed in nanochannels owing to the increased influence of surface interactions. One of the most intriguing features is the theoretical prediction by Hummer et al (2001) of an enhanced flow of aqueous solutions through hydrophobic carbon nanotubes. Experimental work has so far been done on membranes of carbon nanotubes (Hinds et al., Holt et al.). To the best of our knowledge, the experimental investigation of fluid flow through an individual single-wall carbon nanotube has not been conducted. We have developed a fabrication scheme that allows us to do measurements on such individual tubes. It is based on the use of a sacrificial layer etching process to fabricate connections to the nanotube. First measurements reveal that the ionic current through an individual 2 micron long single-wall nanotube is slightly smaller than expected from geometrical considerations. We hope to be able to present more extensive experimental data, e.g. on the variations between individual carbon nanotubes having the same nominal parameters.

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