

Supplemental Information

Chemicals

The following chemicals were used: camphorsulfonic acid 98+% (Fluka, Switzerland), aniline 98+% (BDH Chemicals, England), ammonium persulphate 99+% (Ajax Chemicals, Australia), sodium hydroxide 98% (BDH Chemicals, UK) hydrochloric acid (Ajax Chemicals, Australia) maleic acid (>99 %, Fluka, USA), hydroxy propyl cellulose (Sigma-Aldrich, USA), glucose, lactose and maltose (all > 99 %, Sigma-Aldrich, USA) and 8-aminopyrene-1,3,6-trisulfonic acid APTS (Sigma – Aldrich, USA).

18 MΩ water was obtained from a Millipore Milli-Q water purification system (Bedford, USA) and used throughout.

PDMS Channel Manufacturing

Microfluidic structures with 50 μm deep and 50 μm wide channels in a simple cross design were made by casting polydimethylsiloxane (PDMS, Sylgard 183, Dow Corning, USA) on a SU-8 template, following standard methods.^{20, 21} Three of the channels in the cross design were 2 cm long and the separation channel was 5 cm long. Reservoirs were made in the PDMS using a hole punch and the PDMS substrate was placed channel facing down onto the DFR, aligning the reservoirs with the bare PANI film.