## Supplementary information

## Shear induced fabrication of intertwined single walled carbon nanotube rings

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A systematic evaluation was carried out to determine the optimized conditions required for the organization of the SWCNT rings under shear in the VFD. A dispersion of SWCNTs (0.1 mg/mL) was placed in the VFD tube, 20 mm diameter tube (I.D=  $20.000 \pm 0.013$ ) and the 10 mm diameter tube (I.D=  $7.100 \pm 0.013$  mm) at different rotational speeds, targeting 3000 rpm, 6000 rpm, 7000 rpm and 8000 rpm, and at different inclination angles, 0°, 30°, 45°, 60°, 75° and 90°.



Fig S1: Photographs of the SWCNTs dispersion after the processing under shear; (a) at inclination angles 0°, 30°, 45°, 60°, 75° and 90°, respectively, and (b) at 3000 rpm, 6000 rpm, 7000 rpm and 8000 rpm rotational speeds, respectively (left to right).

The rotational speed of VFD was critical in the formation of the nanorings, with speeds above 6000 rpm being effective. The highest yield of nanorings was observed at 7000 rpm and 8000 rpm, with 6000 rpm affording nanorings in minimal quantity. The choice of inclination angle of the tube was as significant as the choice of rotational speed for the microfluidic processing, which is consistent with other applications of the VFD.<sup>1-5</sup> At low inclination angles (0° to 30°), there was limited formation of the nanorings. At 60° tilt angle nanorings resulted albeit in low yield, and higher angles (75° and 90°) were ineffective in forming such rings. The optimal conditions for the formation of the SWCNT nanorings is for the tube inclined at 45° and rotating at 7500 rpm.



Fig. S2: Images of SWCNTs rings 100 to 200 nm in diameter derived from (a-b) TEM (c) AFM phase image of a SWCNT nanoring, (d-f) AFM phase images of single SWCNT appearing to 'bite' their tail.

## **Control experiments:**



Figure S3: AFM phase images: SWCNT dispersion in toluene/water in the absence of shear (i.e. no VFD processing).



Figure S4: AFM height images: SWCNT dispersion in pure toluene.



Figure S5: AFM images: (a and b) for a colloidal dispersion drop cast immediately from a mixture under sonication (phase image); (c) for a colloidal dispersion drop cast after sonication (10 minutes) (height image); small amounts of SWCNT rings were noticed immediately postsonication collapsed back to those in (c). The rings in (a) and (b) are ca 70-90 nm in diameter.

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