

## Supplementary information

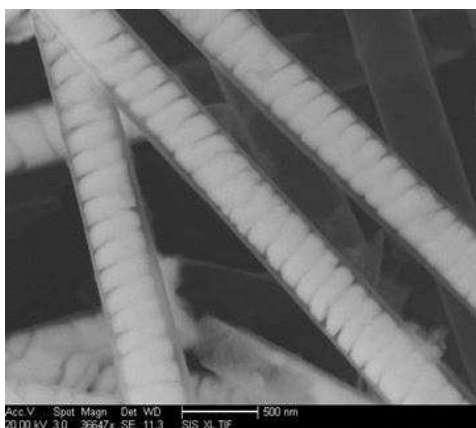
### Template Electrosynthesis of Tailored-Made Helical Nanoswimmers

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#### 1. Supplementary Figures



**Fig. S1** SEM image of 400 nm nanosprings encapsulated within Al<sub>2</sub>O<sub>3</sub> nanotubes after the dissolution of the PC membranes.

#### 2. Supplementary Videos

SI 1. The frequency-dependent transition motion behavior of a 400 nm diameter helical nanoswimmer upon increasing the magnetic frequency from 10 to 100 Hz.

SI 2. Movement of a helical nanoswimmer (3  $\mu\text{m}$  long; 400 nm diameter) over the 3 sec period at a magnetic frequency of 150 Hz.

SI 3. Movements of helical nanoswimmers with different diameters (100, 200 and 400 nm) over the 2 sec period at a magnetic frequency of 120 Hz.