Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information

Figure S1

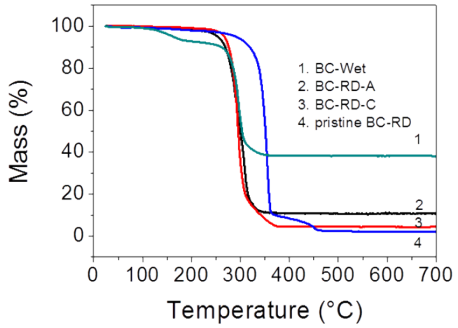
Video of the quick response of BC-SCD to an external magnetic field.

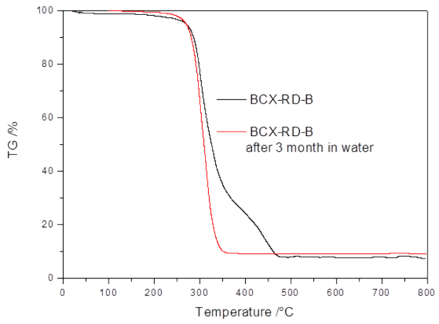
Figure S2

a) TGA curves of magnetic (BC-wet, BC-RD-A, BC-RD-C) and pristine BC-RD bacterial cellulose.

b) TGA curves of magnetic of an as-obtained BC-RD-B film and the one performed after 3 months of soaking confirming the the lack of NP leaching.

c) TGA curves of magnetic of pristine BC-RD bacterial cellulose and of the magnetic cellulose from the hydrophilic and hydrophobic parts, the second one has only 50 % magnetic loading.





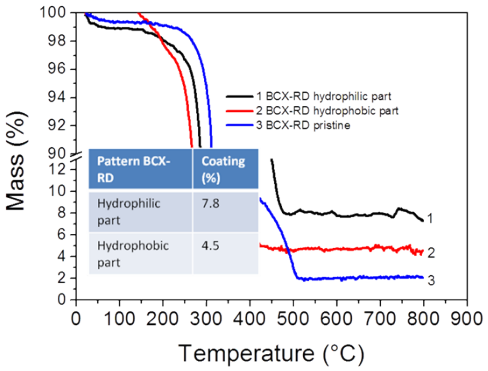


Figure S3

Indexed diffraction patterns to maghemite diffraction planes for the nanoparticles on the cellulose and in solution.

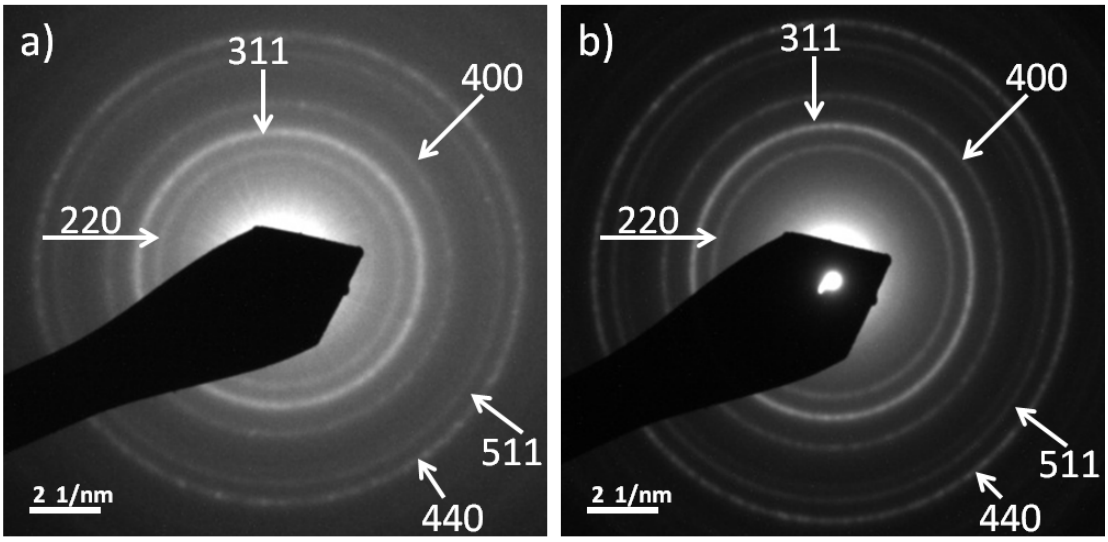


Figure S4

Pictures of magnetic cellulose films immersed in water for about one month without leaching.

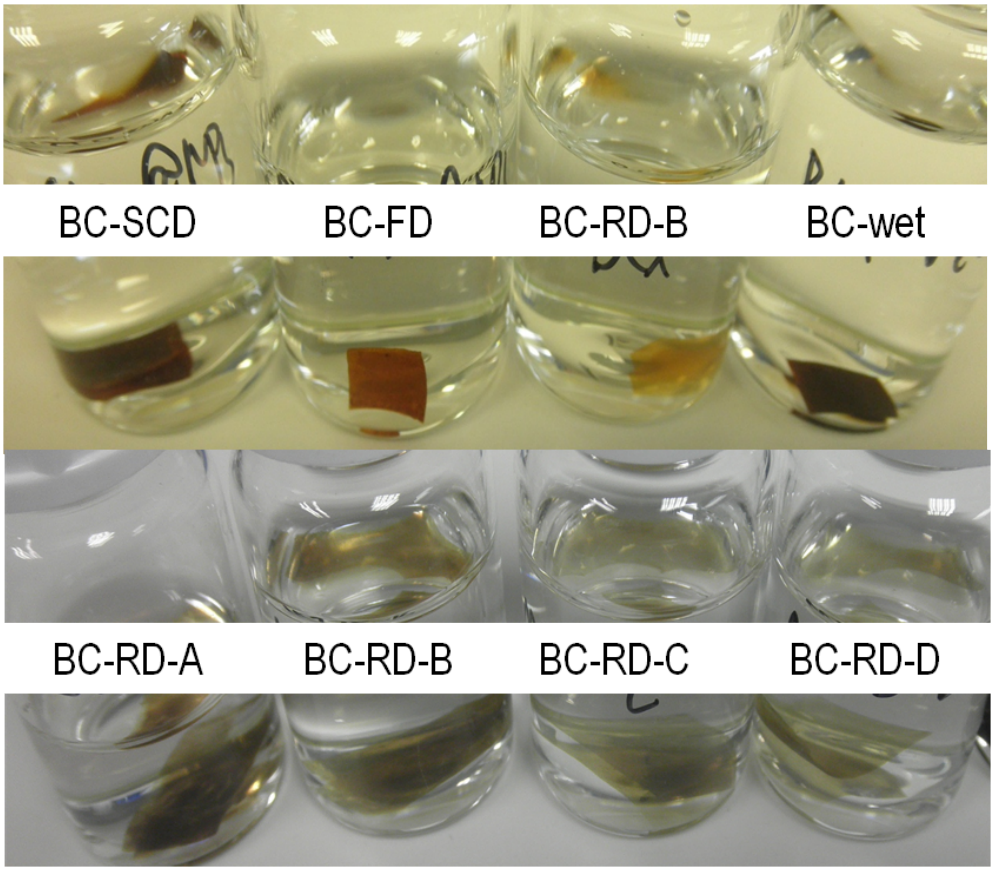


Figure S5
Video of the magnetic origami swarn dancing under a Samarium-Cobalt magnet.

Table S1 Water absorption capacity (WAC) and contact angles of pristine and magnetic cellulose.

Pristine Cellulose	**WAC**	**Contact angle [°]**	**Magnetic cellulose**	**WAC**	**Contact angle [°]**
BC-SCD	45	≈ 0	BC-SCD	6	17
BC-FD	20	8	BC-FD	5	31
BC-RD	34	11	BC-RD	7	45