Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Self-Propelled Screen-Printable Catalytic Swimmers

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Supplementary Videos:

Video S1. Propulsion of printed fish with different Pt-B loadings in their tail area: 15% Pt-B/10% Pt-C (green), 10% Pt-B/10% Pt-C (yellow), 5% Pt-B/10% Pt-C (orange), and without catalytic tail as a control (red), in a 15% hydrogen peroxide solution.

Video S2. High speed movement of the 15 wt% Pt-B fish in a 15% hydrogen peroxide solution.

Supplementary Figures:

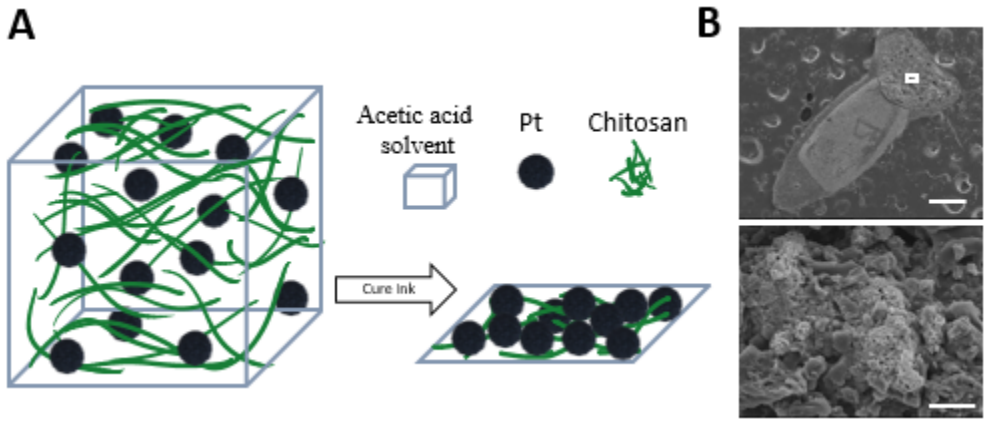

Figure S1. (A) Concept of catalytic ink used for creating the tail section of the printed chemically-powered printed fish. The ink formulation contains chitosan (green matrix) as the binder in acetic acid solvent (blue square) along with the catalytic Pt-B/Pt-C powder (black particles). While mixing the particles into the solvent, the Pt-C/Pt-B has very little activity at the surface as most of the catalytic particles are located in the bulk. As about 80% of the ink is composed of solvent; this solvent is removed upon thermal curing, leaving high concentration of catalytic particles on the printed tail's interface to allow autonomous propulsion. (B) SEM

images of the catalytic ink showing mix of chitosan and catalytic powder embedded in the tail of the fish after curing (scale bars: top 500 µm, bottom 10 µm).

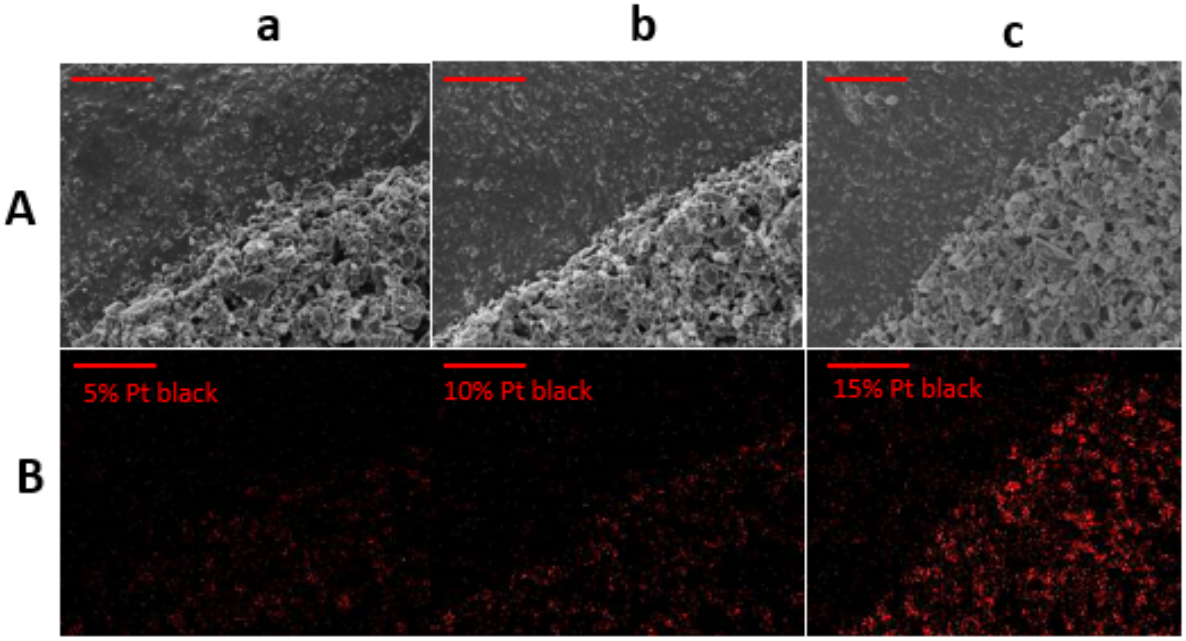

Figure S2. Characterization by (A) SEM and (B) EDX, of the catalytic tails different Pt-Black concentrations, (a) 5%, (b) 10% and (c) 15%.

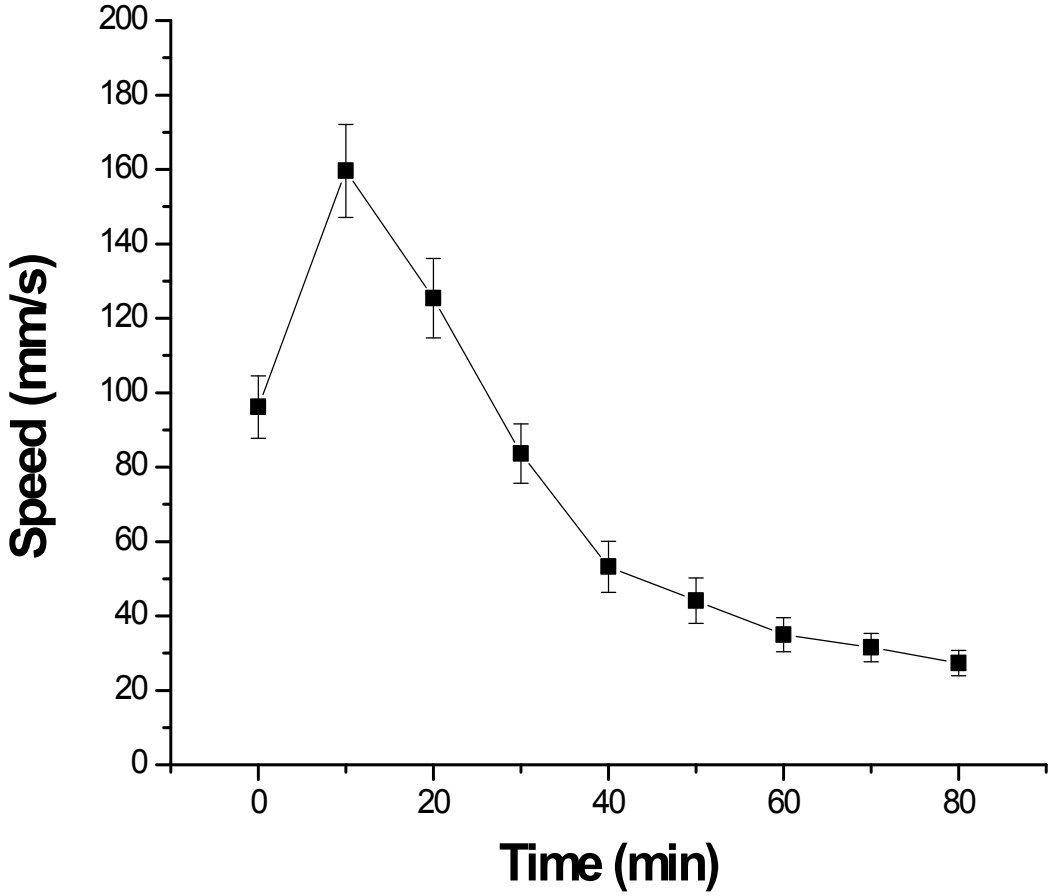

Figure S3. A speed-time dependence of the fastest fish motor (15% Pt-B/10% Pt-C printed fish tail) over 80 min using a 15% H_2O_2 solution.

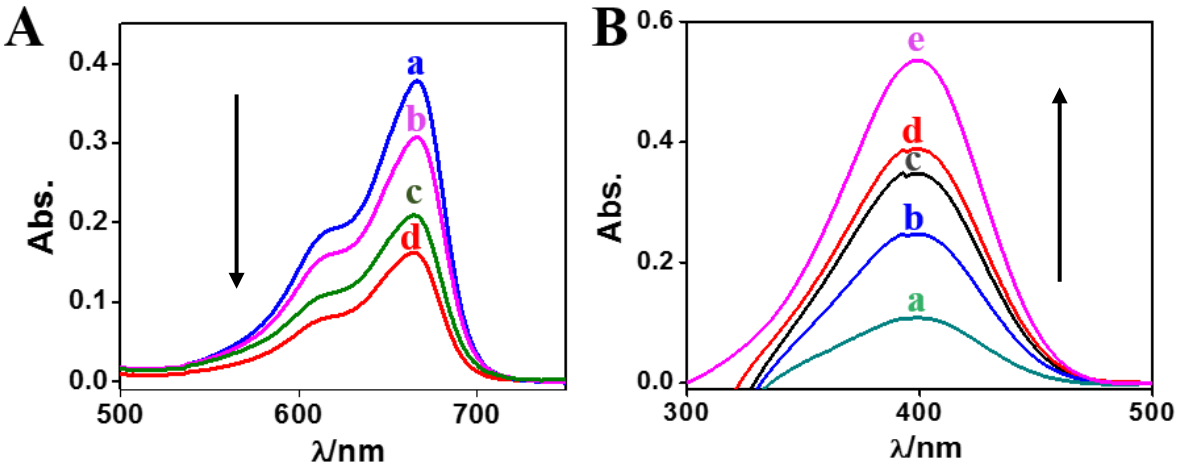

Figure S4. (A) Time effect on absorbance spectra for the residual methylene blue solution

containing catalytically propelled macrofish: (a) standard methylene blue (b) 5 min, (c) 15 min, (d) 60 min. (B) The efficiency of the degradation of the methyl paraoxon process was estimated spectrophotometrically by measuring the absorbance of the *p*-nitrophenol at 400 nm at different reaction times: (a) 5 min, (b) 10 min, (c) 15 min, (d) 20 min, (e) standard absorbance spectra of *p*-nitrophenol, hydrolysis product of standard MP (30 μM).