Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Electronic Supporting Information (ESI)

Self-Propelled Chelation Platforms for Efficient Removal of Toxic Metals

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Supporting videos

SI Video 1. Counterclockwise motion of a spherical Mg/Ti/Au/DMSA micromotor in 0.5 M $NaHCO_3$.

SI Video 2. Straight and clockwise motion of a spherical Mg/Ti/Au/DMSA micromotor in 0.5 M $NaHCO_3$.

SI Video 3. Lifetime of Mg/Ti/Au/DMSA micromotors in 0.5 M $NaHCO_3$.

SI Video 4. Lifetime of Mg/Ti/Au/DMSA micromotors in 70% seawater.

SI Video 5. Propulsion of Mg/Ti/Au/DMSA in lake water (left) and lake water containing 0.1 M NaCl.

Figures

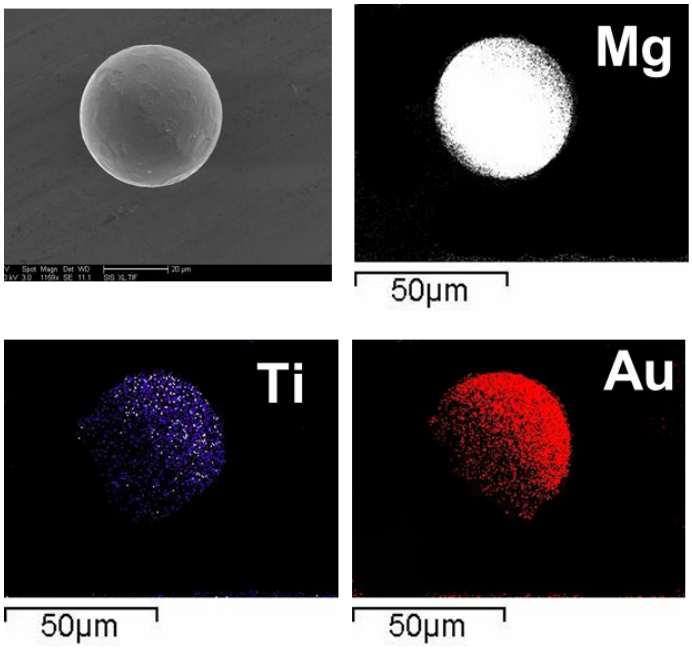

Fig. S1. SEM images and EDX spectroscopy results showing distribution of Mg, Ti and Au in the micromotor.

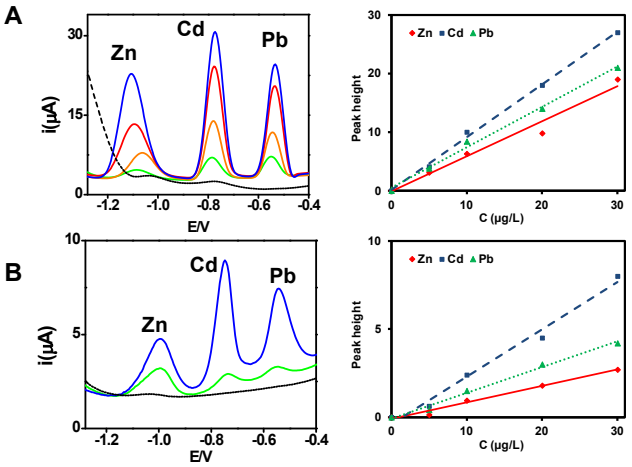

Fig. S2. Stripping voltammograms of increasing levels of Zn (II), Cd (II) and Pb (II) in (A) seawater and (B) human serum, along with background response: 5 (green line), 10 (orange line), 20 (red line) and 30 µg/L (blue line). Also shown (on the right) are the resulting calibration plots. Dotted green line represent the blank signal. Solutions, 0.1 M acetate buffer (pH 4.5), along with 50 µg/L bismuth. Deposition for 120 s at -1.4 V; "cleaning" for 30 s at +0.3 V. Square-wave voltammetric stripping scan with a frequency of 20 Hz, potential step of 5 mV, and amplitude of 25 mV.

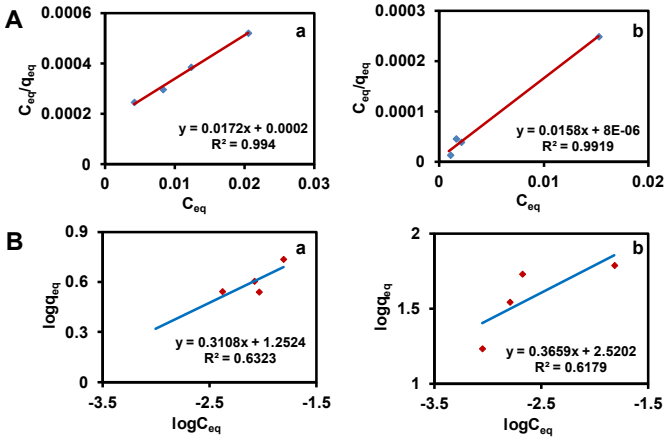

Fig. S3. (A) Langmuir and (B) freundlich isotherms plots for Pb (a) and Cd (b) adsorption onto Mg/Ti/Au/DMSA motors. Conditions: 10 x 10^5 motors/mL in a total volume of 0.2 mL, Pb (II) and Cd (II) concentration: 5-30 µg/L. Medium: 0.5 M $NaHCO_3$, 0.5% triton X-100, 3 min reaction time.

Table S1. Langmuir isotherm parameters for adsorption of metal ions onto Mg/Ti/Au/DMSO micromotors.

Metal ion	Q_{max} (mg/g)	B (L/mg)
Cd^{2+}	63.2	0.00056
Pb^{2+}	55.6	0.011