Supporting Information for

Bubble-Propelled Micro-/Nanomotors of Variable Size by Regulating Surface Microstructure of Partial Coating Shell Pt

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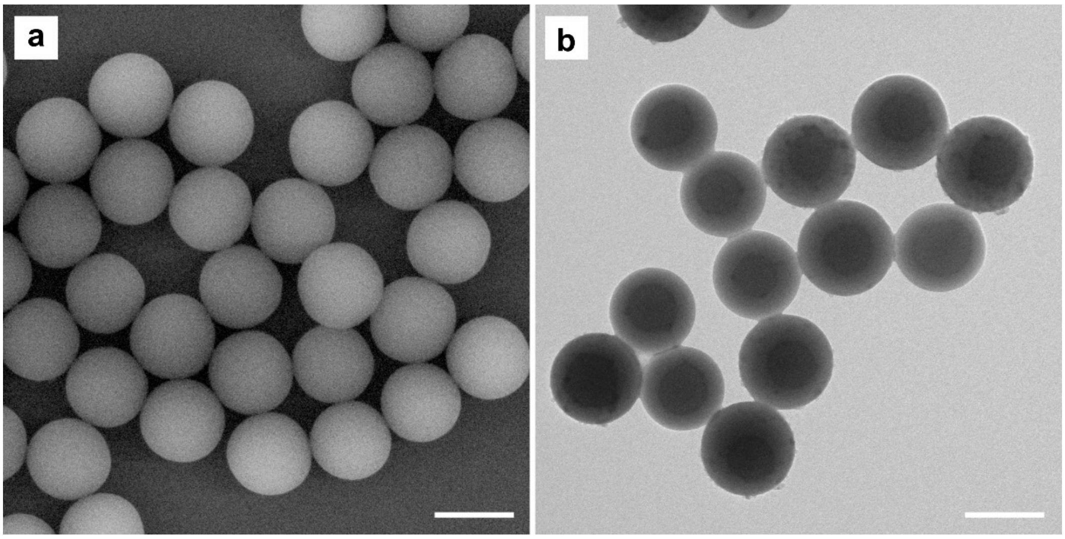


Figure S1. SEM (a) and TEM (b) images of 1-μm PS microspheres. Scale bars: 1 μm.

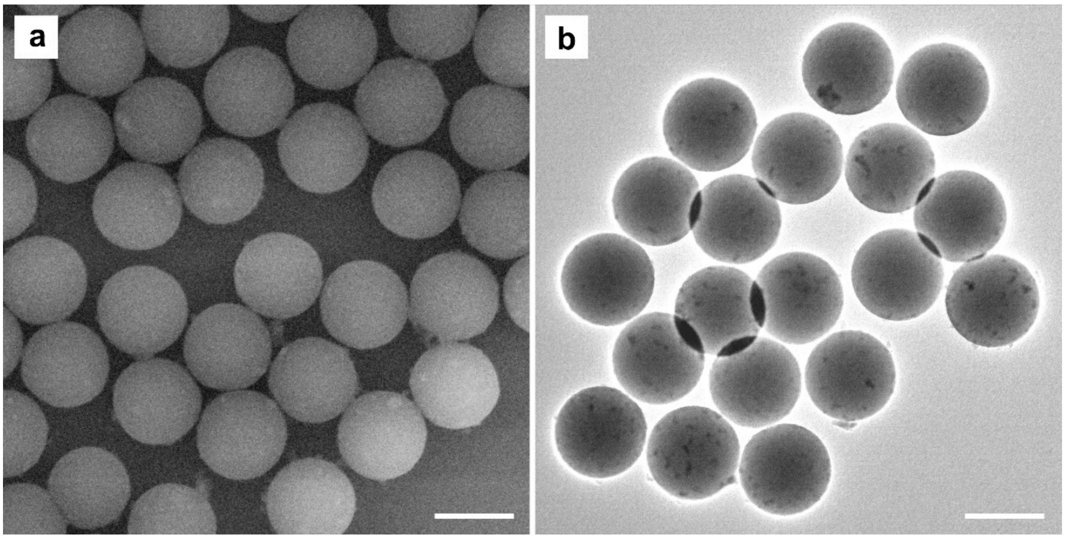


Figure S2. SEM (a) and TEM (b) images of 1-μm PS@PDA core-shell microstructures. Scale bars: 1 μm.

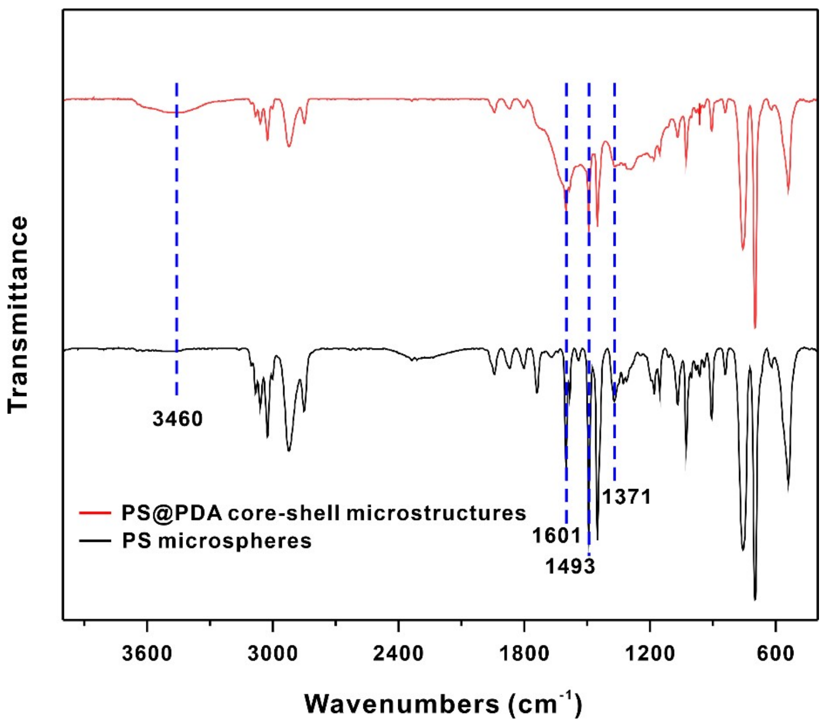


Figure S3. Fourier transform infrared (FTIR) spectra of PS spheres and PS@PDA core-shell microstructures.

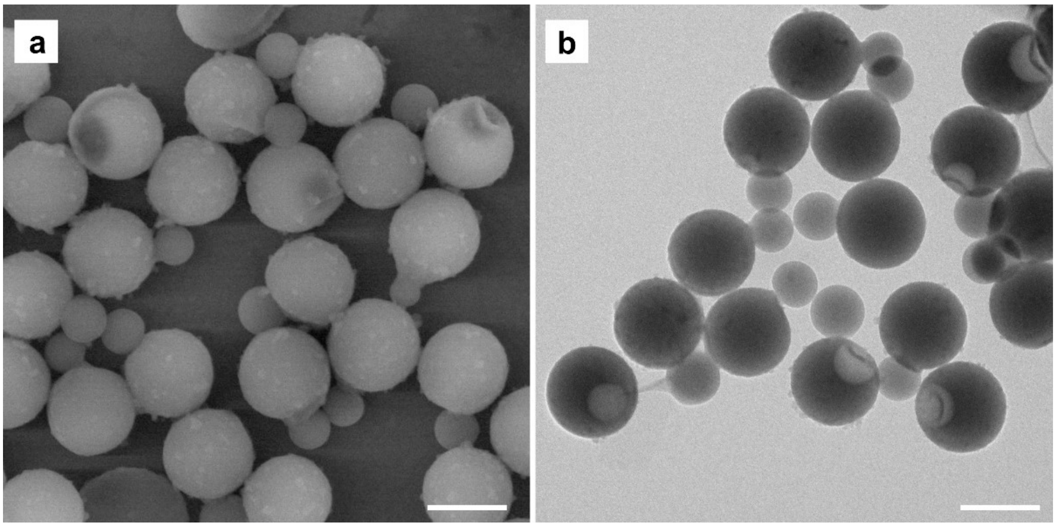
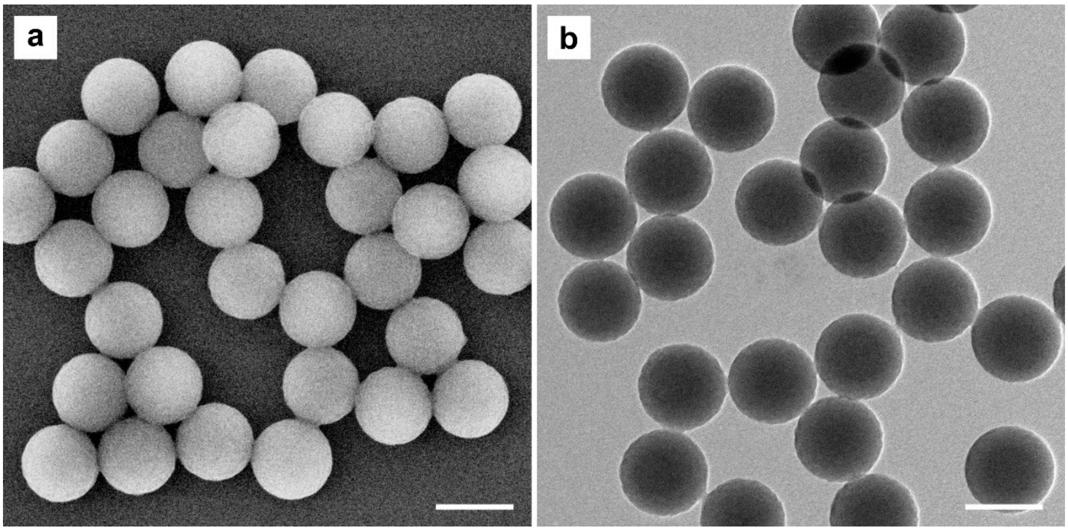


Figure S4. SEM (a) and TEM (b) images of 1-μm PS−PS@PDA eccentric particles. Scale bars: 1 μm.



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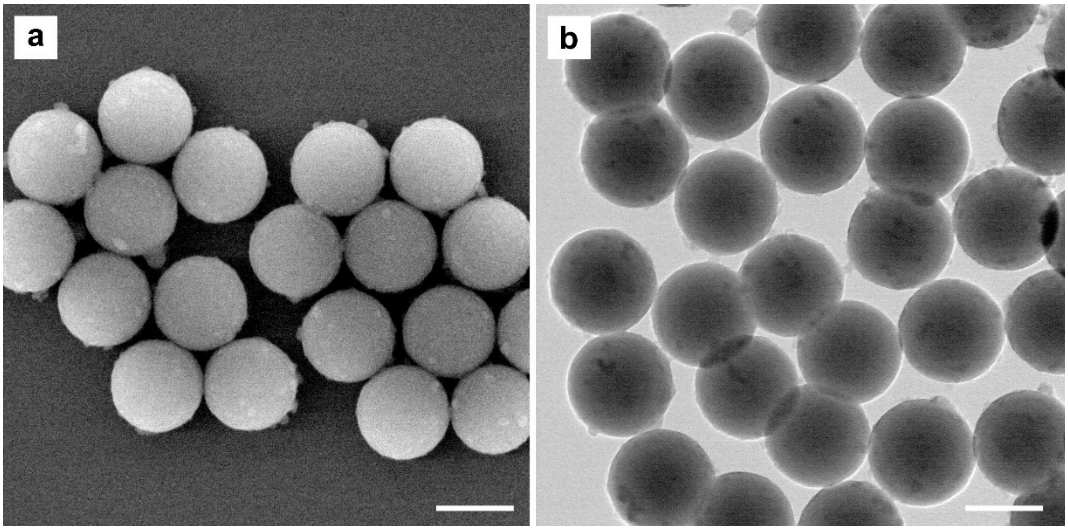

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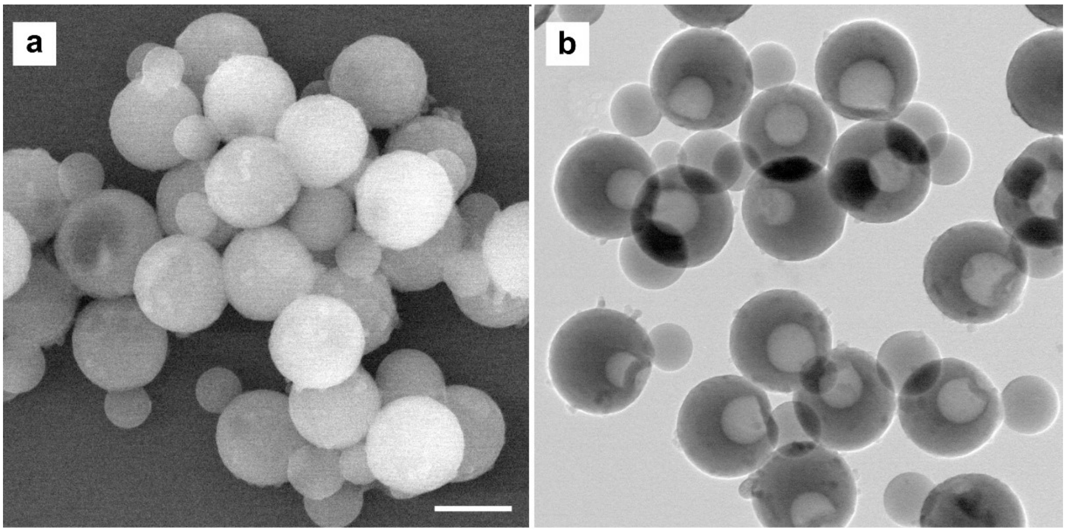

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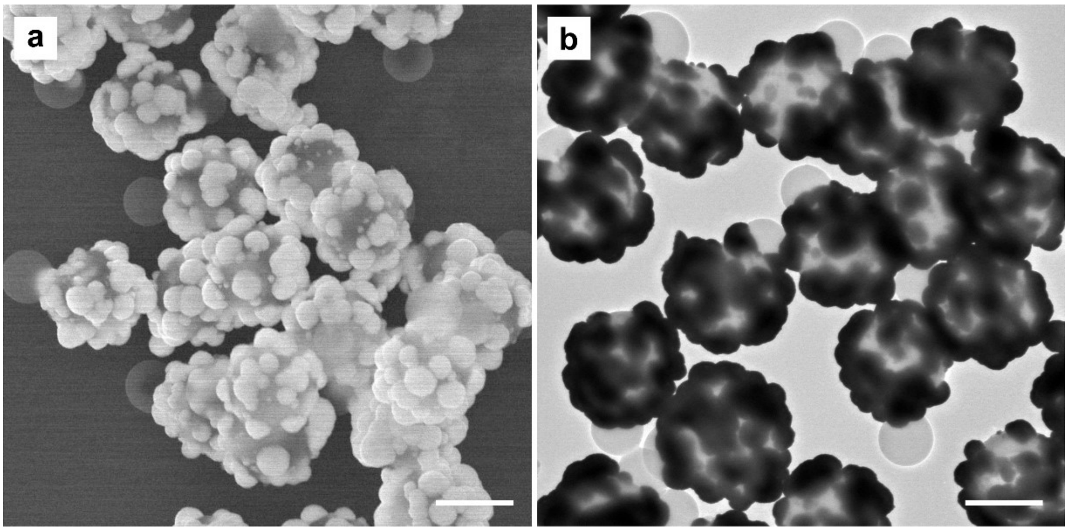

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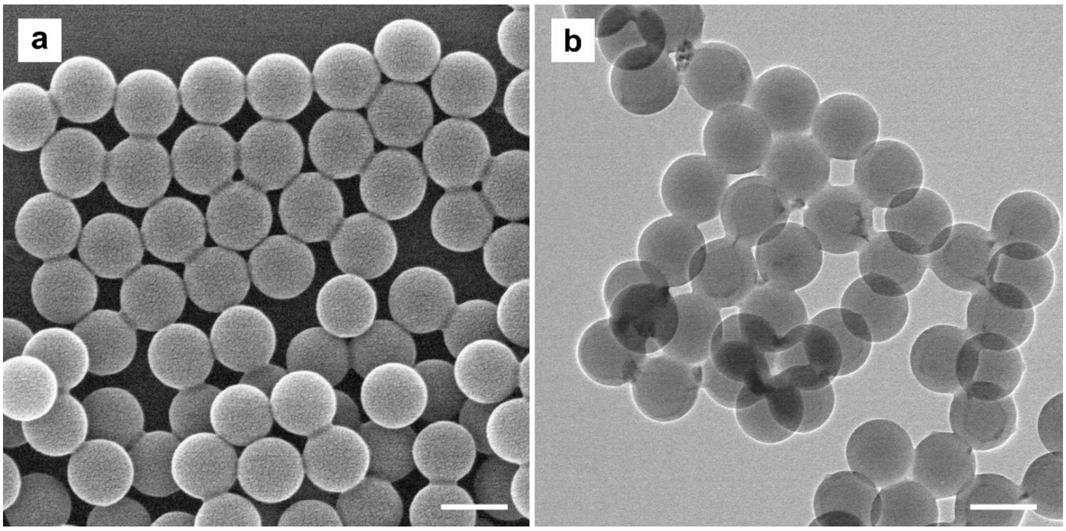

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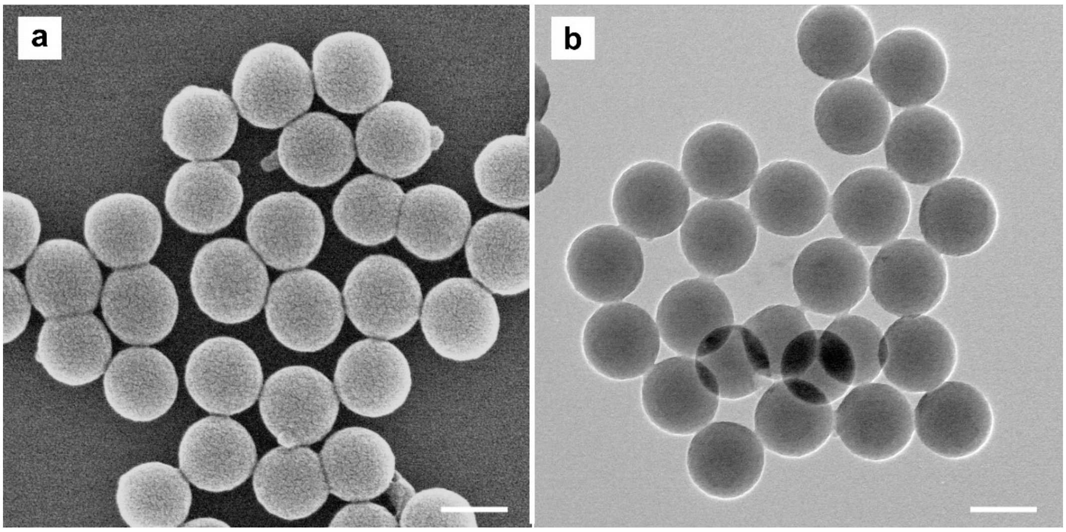
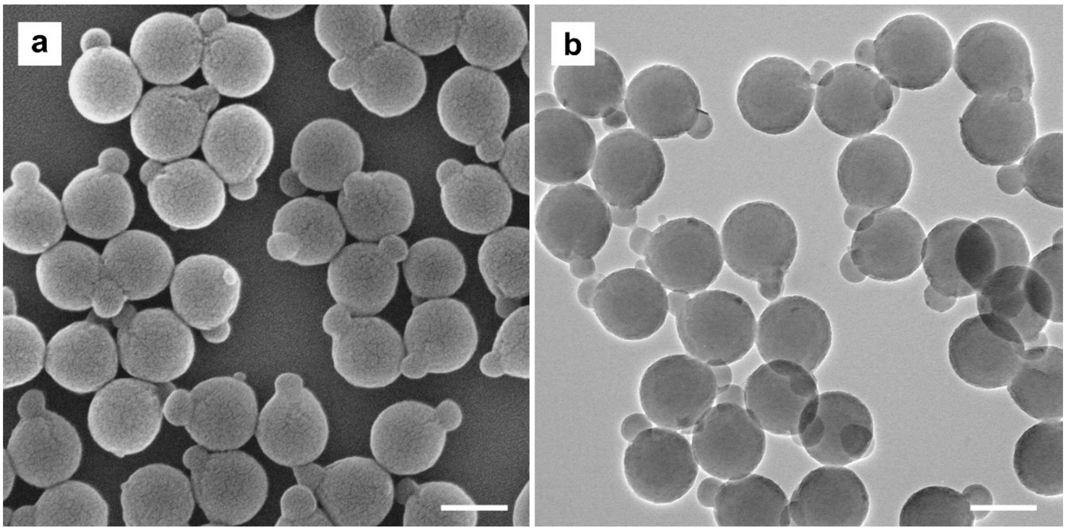


Figure S10. SEM (a) and TEM (b) images of 200-nm PS@PDA core-shell microstructures. Scale bars: 200 nm.



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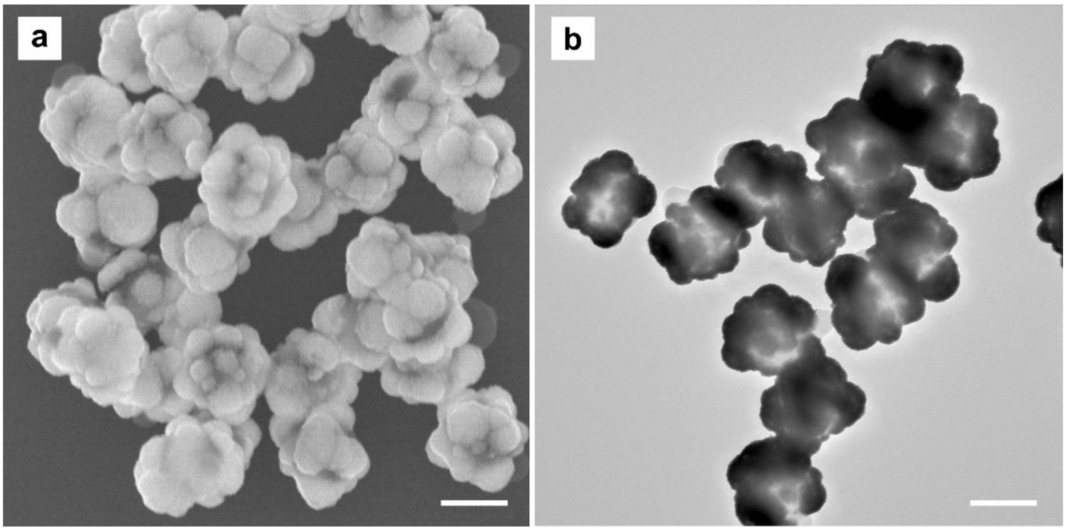

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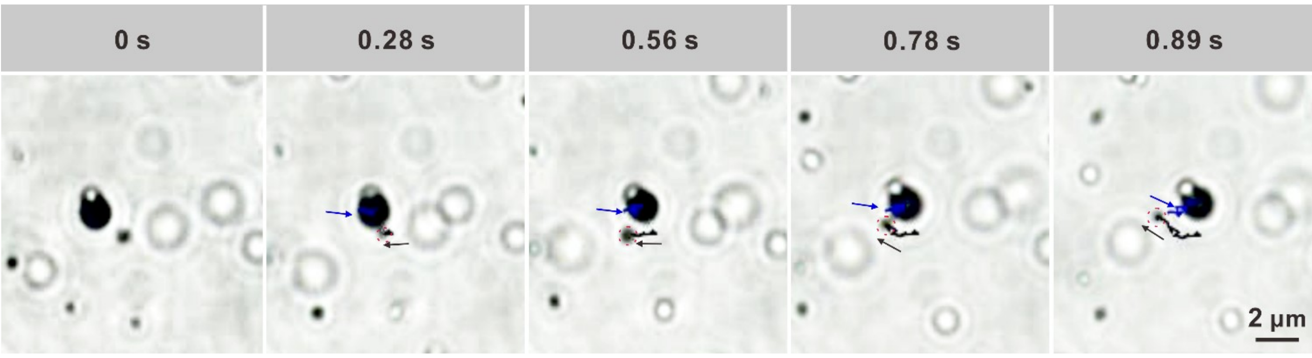

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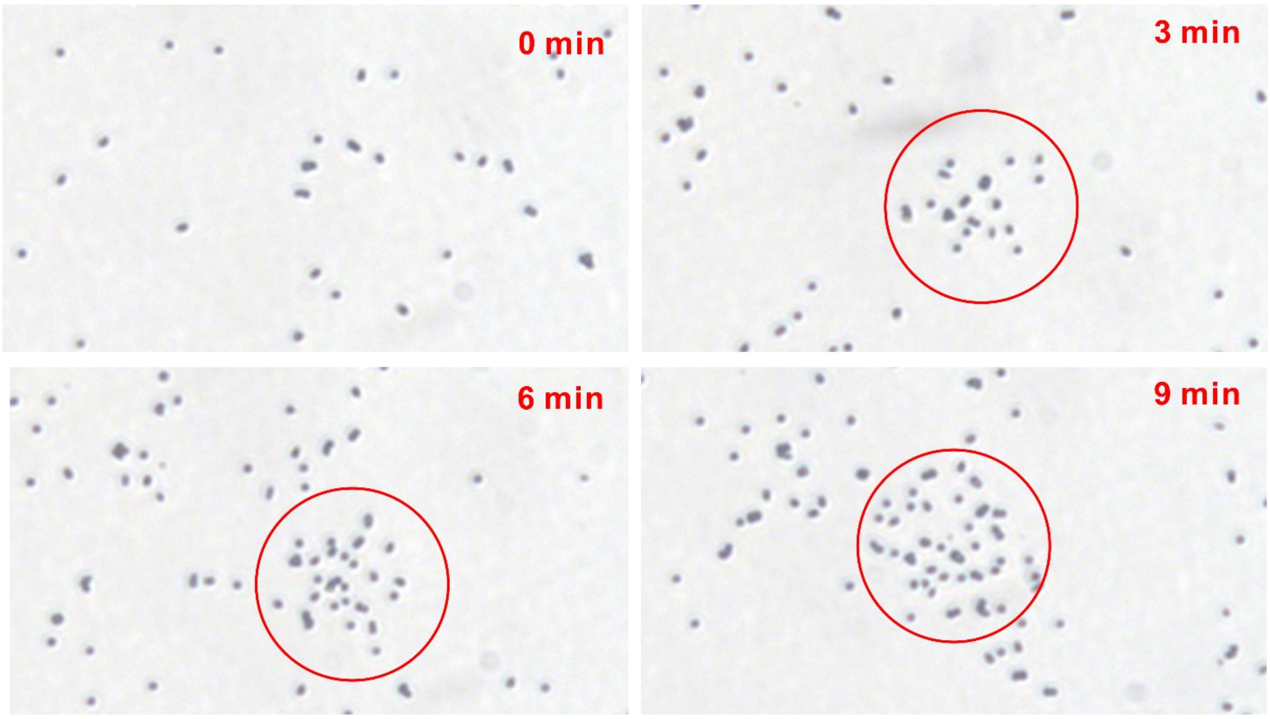

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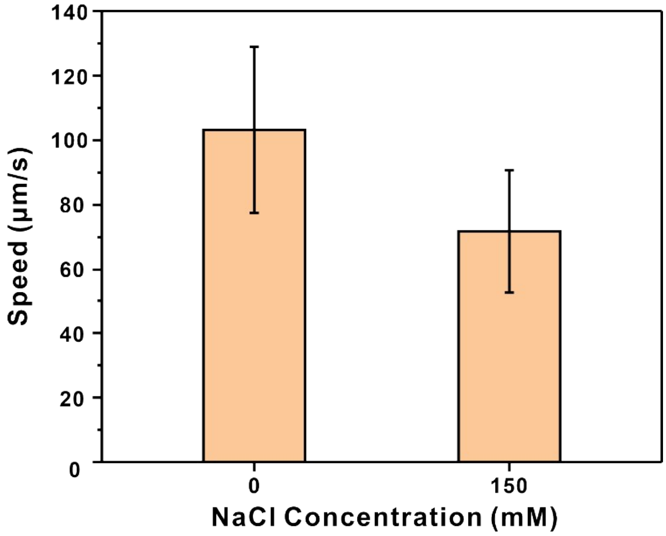
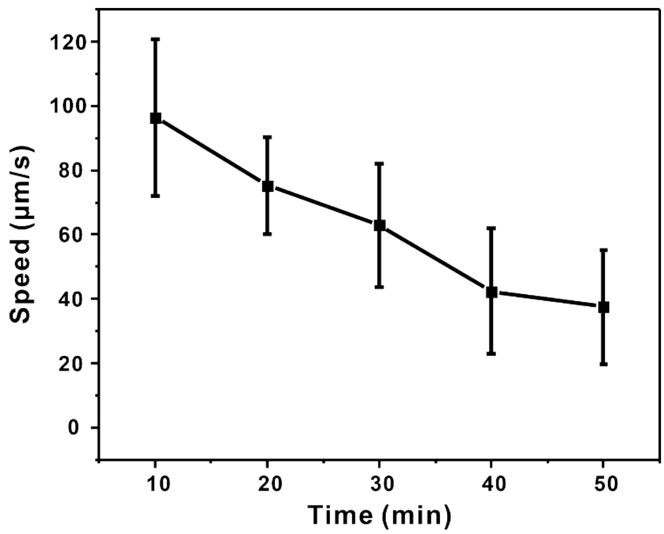


Figure S15. The motion behavior of 1-μm PEMNM when immersed in H_2O_2 aqueous solution (10% v/v) containing different NaCl concentration.



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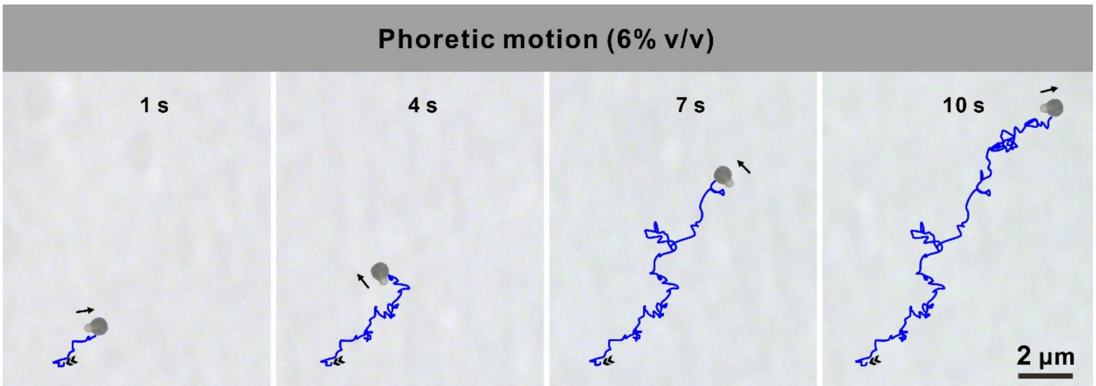

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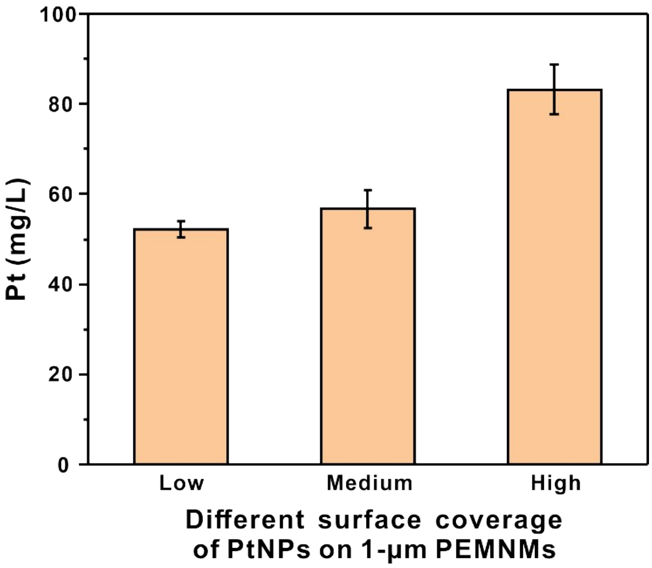

Figure S18. The Pt content of 1-μm PEMNMs with different surface coverage of PtNPs. The number of motor is 2.28×10^8.

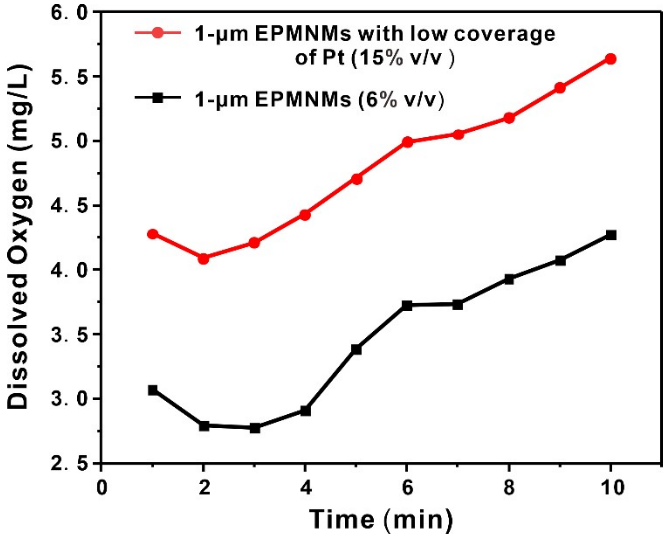

Figure S19. Amount of oxygen produced by 1-μm PEMNMs with different surface coverage of Pt nanoparticles immersed in H_2O_2 aqueous solutions.

Experimental section: In briefly, the same amount of 1-μm PEMNMs with different surface coverage of Pt nanoparticles was added into 5 mL of H_2O_2 aqueous solution. The produced oxygen was measured by a dissolved oxygen test instrument.

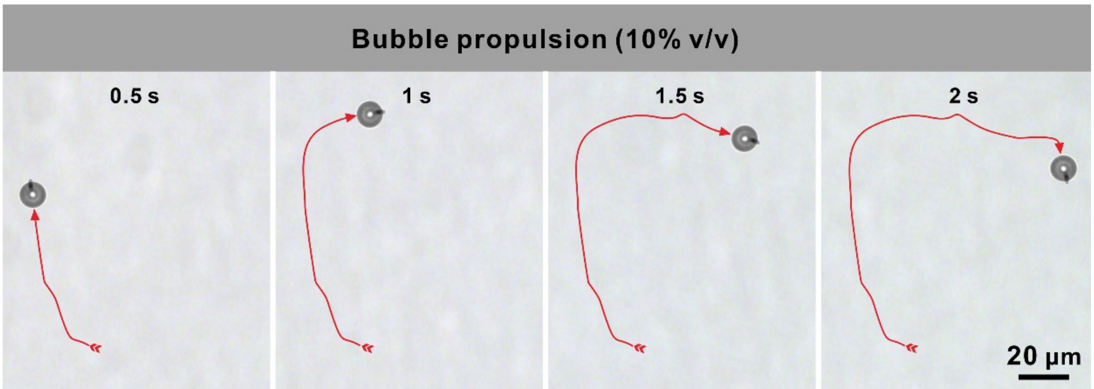

Figure S20. Typical trajectories of 1-μm PEMNMs with high surface coverage of PtNPs in H_2O_2 aqueous solution (10% v/v).

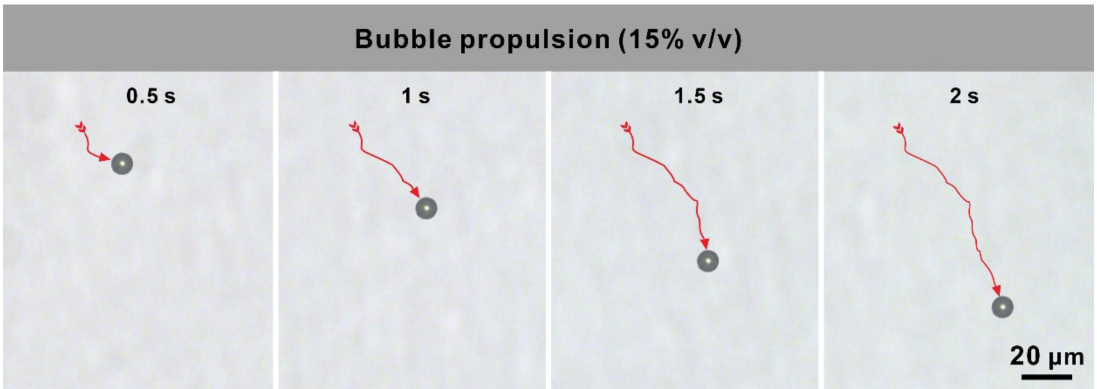

Figure S21. Typical trajectories of 500-nm PEMNMs in 15% v/v H_2O_2 aqueous solution. The images were obtained from the Video S4.

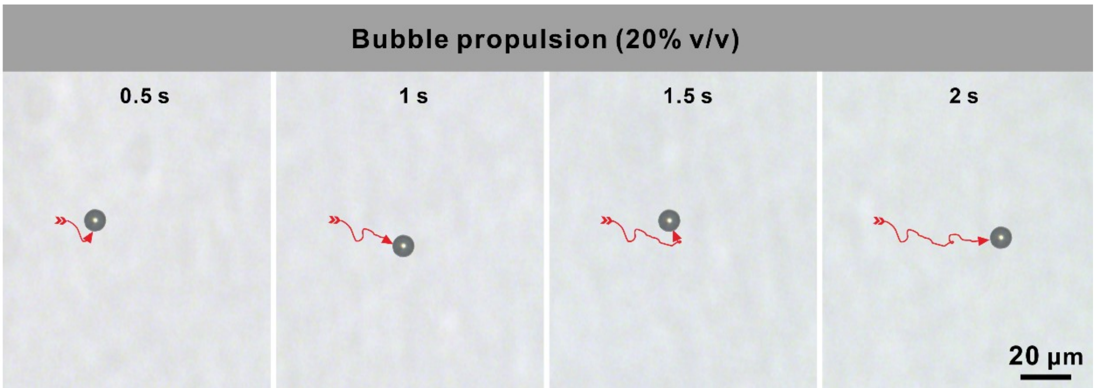

Figure S22. Typical trajectories of 200-nm PEMNMs in 20% v/v H_2O_2 aqueous solution. The images were obtained from the Video S5.

Table S1. Summary of the bubble-propelled MNMs.

Micro-/Nanomotors	Morphology	Size	Fuel	Fabrication Technique	Application	Reference
Magnesium (Mg)/Platinum (Pt) Janus Micromotors	Janus Particles	~20 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	-	*Angew. Chem. Int. Ed.*, **2013**, *52*, 7208−7212.
Hydrogen-Powered Microswimmers (HPMs)	Janus Particles	~24 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	ROS and inflammation scavenging	*Adv. Funct. Mater.,* **2021**, *31*, *2009475.*
Mg-Based Micromotors	Janus Particles	23 ± 5 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	Therapy of rheumatoid arthritis	*Nano Lett.,* **2021**, *21*, *1982–1991.*
Enteric Mg Micromotors	Tubular	~5 µm (Diameter) ~23.2 µm (Length) (SEM)	Water	Template Electrodeposition	Site-specific gastrointestinal delivery	*ACS Nano*, **2016**, *10*, 9536−9542.
Aluminum (Al)-Gallium (Ga)/Titanium (Ti) Micromotor	Janus Particles	~ 20 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	-	*ACS Nano*, **2012**, 6, 8432−8438.
Multi-Response Biocompatible Janus Micromotor	Janus Particles	~25 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	Medical imaging	*Appl. Mater. Today*., **2021**, *23*, 101026.
Mg-TiO_2 micromotor	Janus Particles	20~25 µm (Diameter) (SEM)	Water	Physical Vapor Deposition	-	*Research*, **2020**, *2020*, 7823615.
Zinc (Zn) / Iron (Fe) Janus Micromotors	Janus Particles	~ 20 µm (Diameter) (SEM)	Acid	Physical Vapor Deposition	-	*ACS Nano*, **2016**, *10*, 10389−10396.
Polyaniline (PANI)/Zn Micromotors	Tubular	~0.35 µm (front inner Diameter) ~1.2 µm (outer layer Diameter) ~10 µm (Length) (SEM)	Acid	Template Electrodeposition	Pick-up, transport, and release of cargoes	*J. Am. Chem.Soc*., **2012**, *134*, 897−900.
Zerovalent-Iron (ZVI)/Pt Janus Micromotors	Janus Particles	~60 µm (Diameter) (SEM)	H_2O_2	Physical Vapor Deposition	Removal of 2,4-dinitrotoluene and Rhodamine 6G	*Small*, **2015**, *11*, 499−506.
MOF-Integrated Photocatalytic Micromotors.	Janus Particles	200 µm (Diameter) (SEM)	H_2O_2	Colloidal Chemistry Method	Degradation of organic contaminant Rhodamine B	*ACS Appl. Mater. Interfaces*, **2020**, *12*, 35120−35131.
Pt Micro/Nanomotors	Tubular	0.23 µm to 4.74 µm (Diameter) 2.25 µm to 17.25 µm (Length) (SEM)	H_2O_2	Template Electrodeposition	-	*ACS Nano*, **2016**, *10*, 5041−5050.
Tubular Catalytic Micromotors	Tubular	10 µm (Diameter) 50 µm (Length) (SEM)	H_2O_2	Template Electrodeposition	-	*Small*, **2021**, *17*, 2006449

Poly(3,4-ethylenedioxythiophene) (PEDOT)/ Manganese Dioxide (MnO_2) Micromotor	Tubular	5 µm (Diameter) 15 µm (Length) (SEM)	H_2O_2	Template Electrodeposition	-	*Small*, **2020**, 2003678.
Pot-like Structure Pt Motors.	Pot-like	23 ± 4.4 µm (Diameter) (SEM)	H_2O_2	Physical Vapor Deposition/ Colloidal Chemistry Method	-	*Nanoscale*, **2014**, *6*, 11177–11180.
Pt Micromotors	Pot-like (Rough)	~3 µm (Diameter) (SEM)	H_2O_2	Physical Vapor Deposition/ Colloidal Chemistry Method	-	*ACS Nano*, **2016**, *10*, 8751–8759.
Carbonaceous Nanoflask (CNF) Motor	Flask-like	550~700 nm (Diameter) (SEM)	H_2O_2	Colloidal Chemistry Method	-	*Langmuir*, **2020**, *36*, 7039–7045.
Pt−Polystyrene (PS) Micromotors	Dimer	~1 µm (Diameter) (SEM)	H_2O_2	Colloidal Chemistry Method	-	*Langmuir*, **2014**, *30*, 3477−3486.
PS−PS@Polydopamine (PDA)@Pt Micro-/Nanomotors	Dimer	~0.2 µm to 1 µm (Diameter) (SEM and TEM)	H_2O_2	Colloidal Chemistry Method	-	This work
Silver (Ag) Catalytic Micromotors	Janus Particles	~20 µm (Diameter) (SEM)	H_2O_2	Physical Vapor Deposition/ Colloidal Chemistry Method	-	*J. Am. Chem. Soc.*, **2014**, *136*, 2719−2722.
Fe-MnO_2 Core-shell Micromotors	Particles (Rough)	~2 µm (Diameter) (SEM)	H_2O_2	Colloidal Chemistry Method	Decontamination of antibiotics	*Appl. Catal. B.*, **2022**, *314*, 121484.
Cobalt-Ferrite (CFO) Micromotor	Particles	~100 µm (Diameter) (SEM)	H_2O_2	Colloidal Chemistry Method	Removal of malachite green in water	*Small*, **2022**, *18*, 2107619.
Hyperbranched Polyamide/L-arginine (HLA_n) Micro-/Nanomotors	Particles	~120 nm to Several Micrometers (Diameter) (SEM and TEM)	H_2O_2	Colloidal Chemistry Method	-	*Nat. Commun.*, **2019**, *10*, 966.