

Electronic Supplementary Information

Buoyant Force-Induced Continuous Floating and Sinking of Janus Micromotors

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Movie S1. Side view of Au-GCB-Pt in 0.526% H₂O₂ solution, mixture solution of 0.526% H₂O₂ and 0.021 g/L SDS, mixture solution of 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄, and mixture solution of 0.526% H₂O₂ and 0.185 M Na₂SO₄.

Movie S2. Orientation of Au-GCB-Pt in fuel solution containing 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄.

Movie S3. Top view of Au-GCB-Pt in fuel solution containing 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄.

Movie S4. Motion performance of Au-GCB-Pt placed on solution surface and in solution. Fuel solution contains 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄.

Movie S5. Motion of Au-GCB-Pt with different surface coverage of Pt. Au was deposited at 50 V for 2 min. The deposition voltage for Pt was 30, 40, 50, 60 and 70 V, respectively. Fuel solution contains 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄.

Movie S6. Swimming of Au-GCB-Pt in fuel solution containing 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M Na₂SO₄ after 10 min, 1 h, and 3 h.

Movie S7. Swimming of Au-GCB-Pt in fuel solution containing 0.526% H₂O₂, 0.021 g/L SDS and 0.185 M electrolytes (H₂SO₄, NaCl and NaHCO₃).

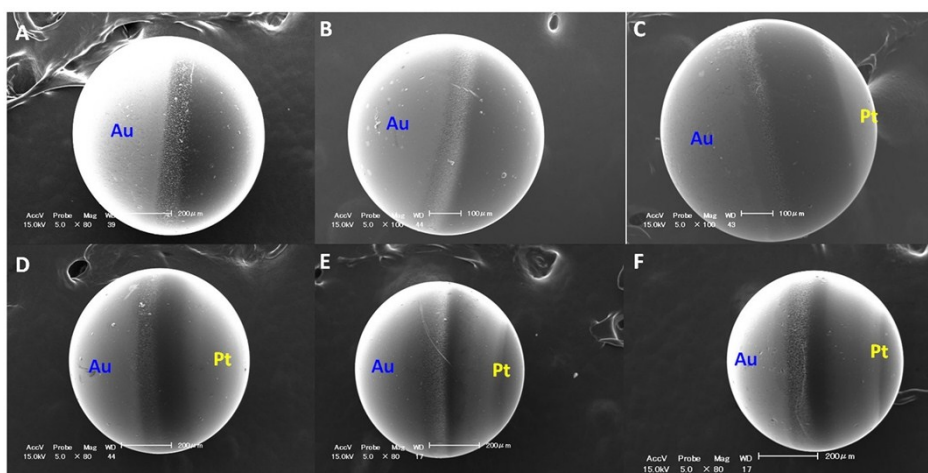


Fig.S1. SEM images of Au-GCB (A) and Au-GCB-Pt (B to F). Au was deposited at 50 V for 2 min. The deposition voltage of Pt NPs from (B) to (F) was 30, 40, 50, 60 and 70 V, respectively. The deposition time of Pt was 2 min.

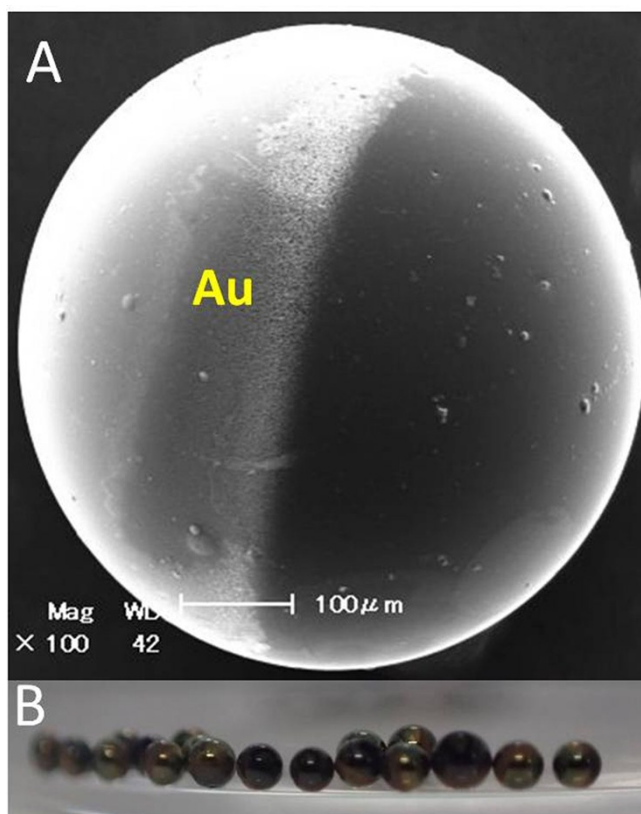


Fig.S2 (A) SEM image of Au-GCB-Pt. (B) Au-GCB-Pt in fuel solution containing 0.526% H_2O_2 , 0.021 g/L SDS, and 0.185 M Na_2SO_4 . The volume of fuel solution was 6.0 mL. The deposition voltages for Au and Pt were 50 and 20 V, respectively.

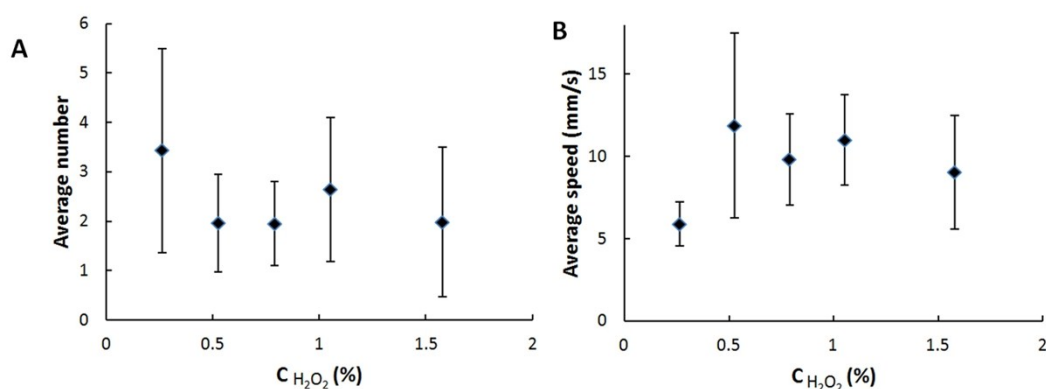


Fig.S3. (A) Average number of Au-GCB-Pt moved in each frame as a function of H_2O_2 concentration. (B) Average speed of Au-GCB-Pt in fuel solution. The concentration of SDS was 0.021 g/L. The concentration of Na_2SO_4 was 0.185 M.

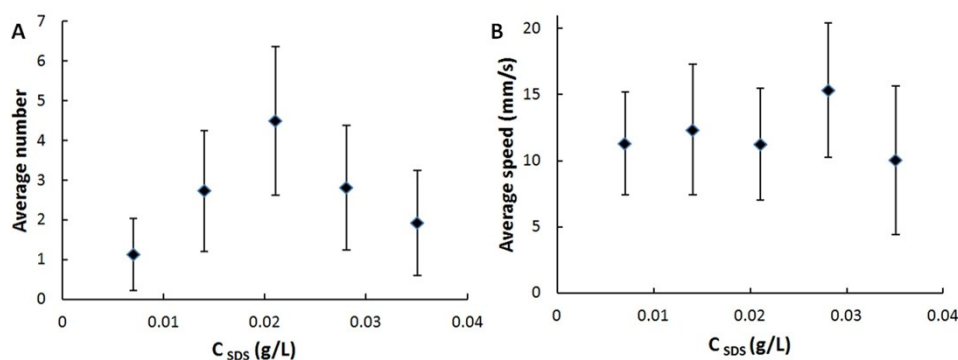


Fig.S4. (A) average number of Au-GCB-Pt moved in each frame as a function of SDS concentration. (B) Average speed of Au-GCB-Pt in fuel solution. The concentration of H_2O_2 was 0.526%. The concentration of Na_2SO_4 was 0.185 M.

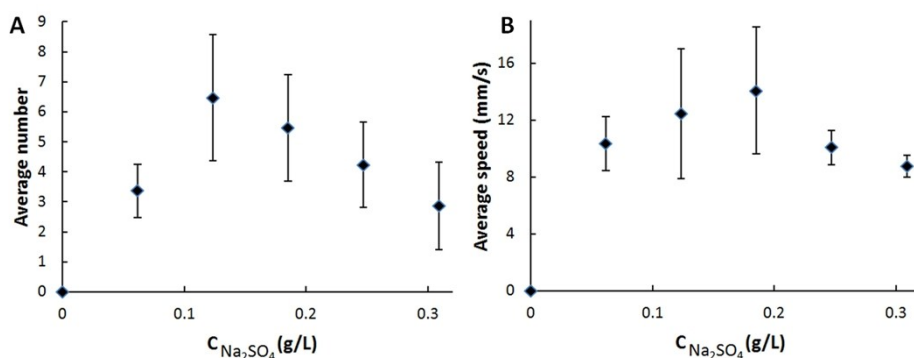


Fig.S5. (A) average number of Au-GCB-Pt moved in each frame as a function of Na_2SO_4 concentration. (B) Average speed of Au-GCB-Pt in fuel solution. The concentration of H_2O_2 was 0.526%. The concentration of SDS was 0.021 g/L.

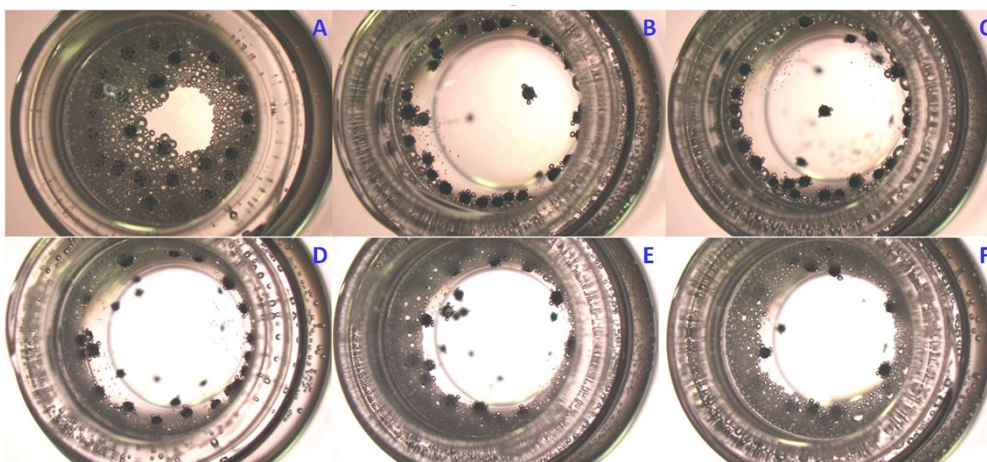


Fig.S6. Top view of Au-GCB-Pt in fuel solution. The concentration of H_2O_2 was 0.526%. The concentration of SDS was 0.021 g/L. The concentration of Na_2SO_4 from A to F was 0, 0.062, 0.123, 0.185, 0.247, and 0.308 M, respectively.

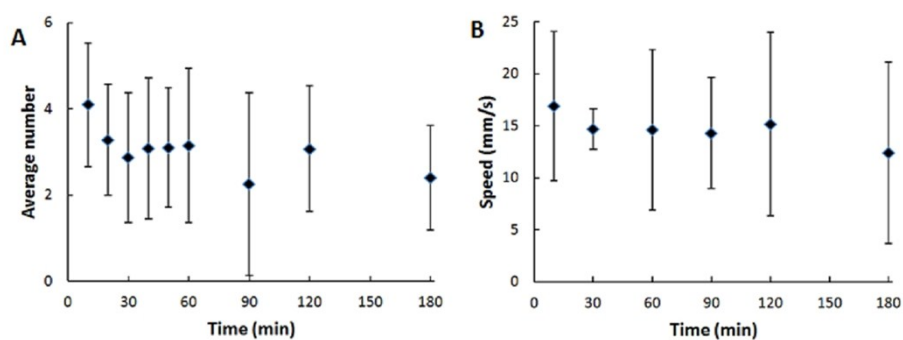


Fig.S7. (A) Average number of Au-GCB-Pt moved in each frame and (B) Average speed of Au-GCB-Pt in fuel solution containing 0.526% H_2O_2 , 0.021 g/L SDS and 0.185 M Na_2SO_4 .