## **Electronic Supplementary Information (ESI)**

## **ESI Videos**

ESI Video 1 An Au-Fe/Ni nanomotor rotate on its axis in a mixed fuel containing H<sub>2</sub>O<sub>2</sub> and N<sub>2</sub>H<sub>4</sub>.

ESI Video 1' The playback speed of ESI Video 1 is about twenty times slower.

ESI Video 2 The flat rotation of an individual Fe/Ni nanomotor in a solution composed of  $H_2O_2$  and  $N_2H_4$ .

ESI Video 2' The playback speed of ESI Video 2 is about twenty times slower.

ESI Video 3 The spiral motion of an Au-Fe/Ni nanomotor in a solution composed of  $\rm H_2O_2$  and  $\rm N_2H_4.$ 

ESI Video 3' The playback speed of ESI Video 3 is forty times slower.

ESI Video 4 The movement of a rodlike aggregation containing some particles in a solution composed of  $H_2O_2$  and  $N_2H_4$ .

ESI Video 5 The motion of a disc-shaped aggregation including some particles in a solution composed of  $H_2O_2$  and  $N_2H_4$ .

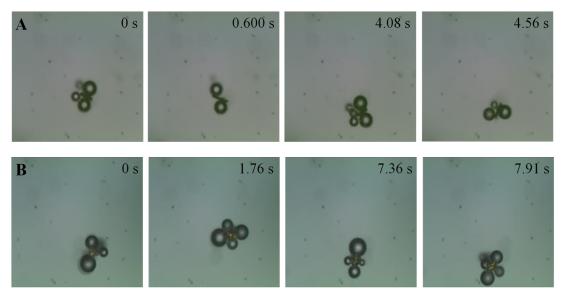
## **ESI Figures**



ESI Fig. 1 SEM images of Au-Fe/Ni nanomotors. Scale bars indicate 10  $\mu m$  (A) and 5  $\mu m$  (B).



ESI Fig. 2 Images to describe an individual nanomotor (A) rotation on its axis; (B) flat rotation; (C) spiral motion.



ESI Fig. 3 Images to describe the movement of (A) rodlike aggregation containing some particles; (B) disc-shaped aggregation including some particles