Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Honeycomb-like active microswarm for magnetic-tunable cascade enzyme catalysis

Ruirui Guo#, Dong Liu#, Yanjie Huang, Bin Wang, Jian Dong, Yuan Lu**

*Corresponding authors. Email: yuanlu@tsinghua.edu.cn (Y. Lu),

dongjian@tust.edu.cn (J. Dong)

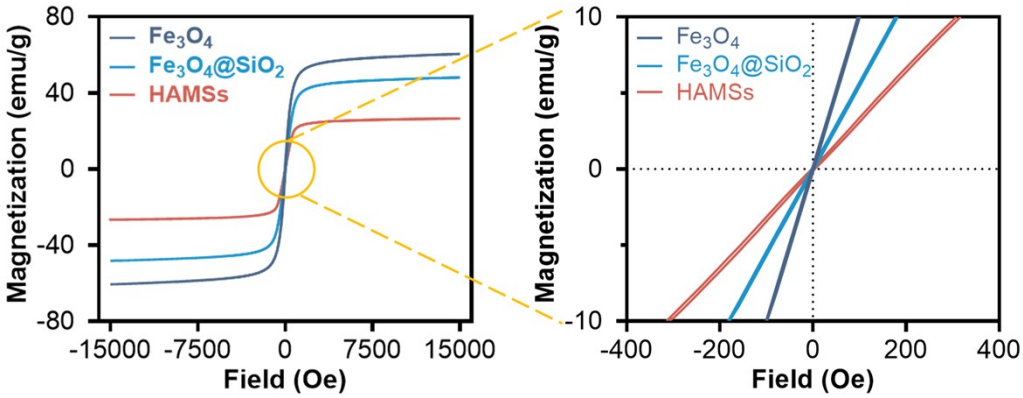
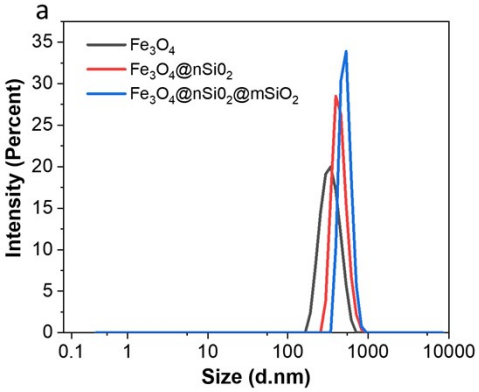


Figure S1. Magnetic hysteresis loops of Fe_3O_4, Fe_3O_4@nSiO_2, and HAMSs

a



b

Materials	Average particle size
Fe_3O_4	295nm
Fe_3O_4@nSiO_2	396nm
Fe_3O_4@nSiO_2@mSiO_2	532nm

Figure S2. (a)Size distribution of Fe_3O_4, Fe_3O_4@nSiO_2, and Fe_3O_4@nSiO_2@mSiO_2 nanoparticles by intensity. (b)Average particle size of Fe_3O_4, Fe_3O_4@nSiO_2, and Fe_3O_4@nSiO_2@mSiO_2 nanoparticles.

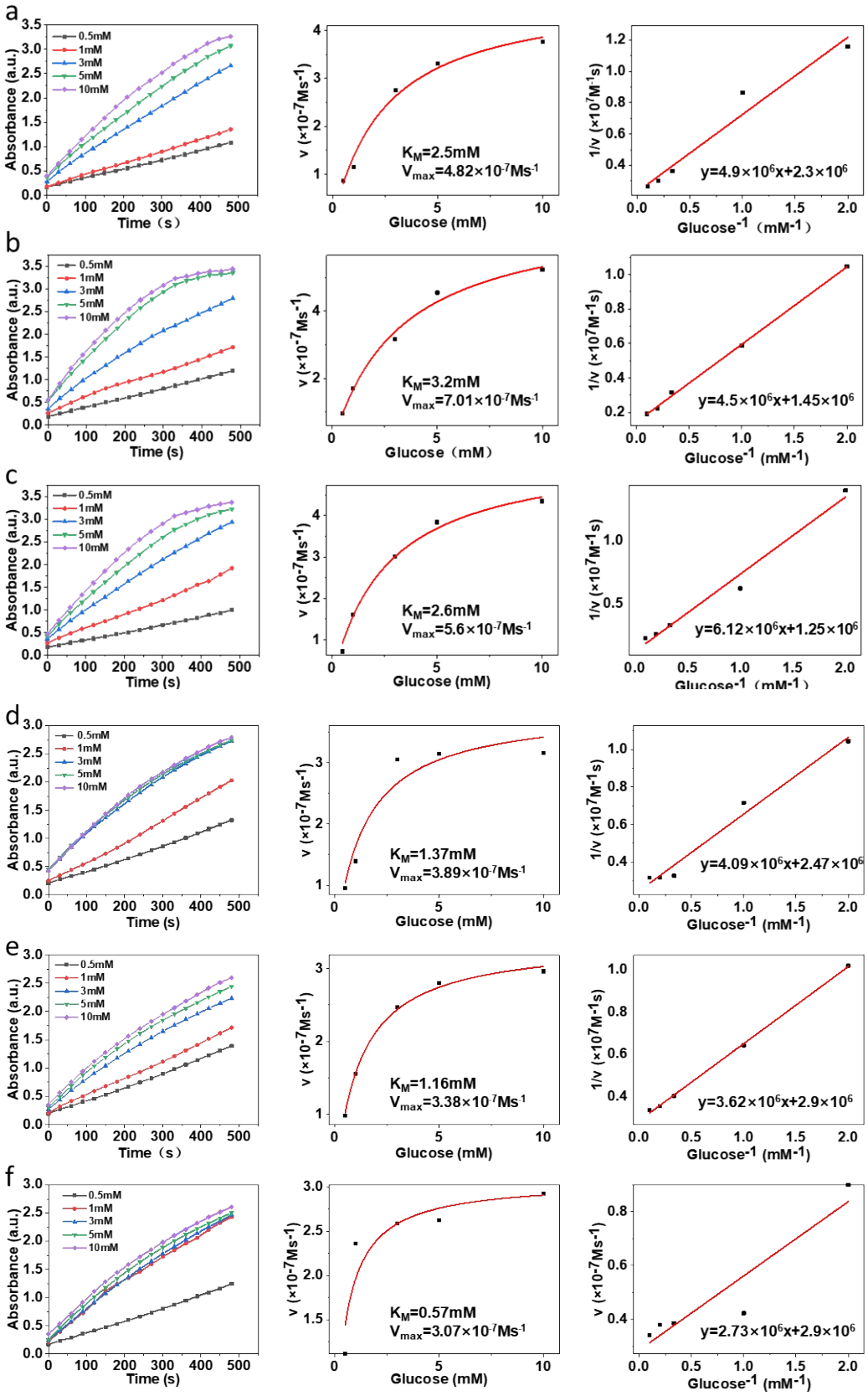


Figure S3. a) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=4.2, Michaelis-Menten kinetic analysis and

Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate, b) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=5.2, Michaelis-Menten kinetic analysis and Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate, c) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=6.3, Michaelis-Menten kinetic analysis and Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate, d) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=7.4, Michaelis-Menten kinetic analysis and Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate, e) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=8.8, Michaelis-Menten kinetic analysis and Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate, f) The absorbance curve of oxTMB catalyzed at 652 nm with time under different concentrations of H_2O_2 at pH=9.8, Michaelis-Menten kinetic analysis and Lineweaver-Burk curve for the reaction of HAMSs with H_2O_2 as substrate,

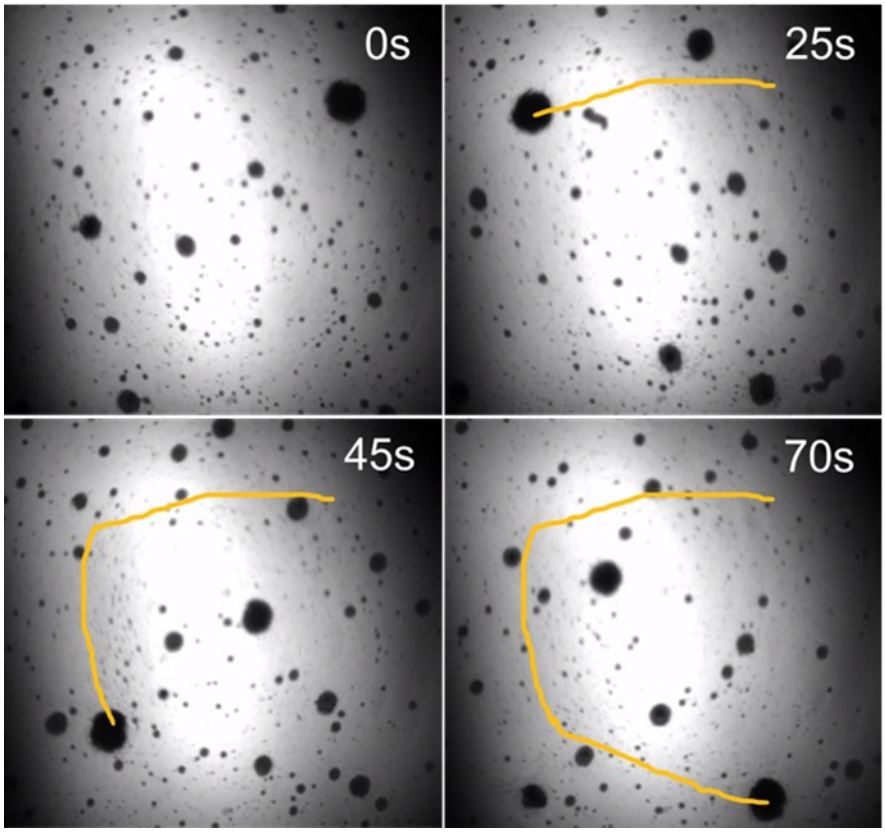


Figure S4. The C-shaped trajectory of HAMSs in aqueous solution.

Movie S1. C-shaped trajectory of HAMSs under 3D magnetic field.

Movie S2. Z-shaped trajectory of HAMSs under 3D magnetic field.

Movie S3. C-shaped trajectory of HAMSs under 3D magnetic field.

Movie S4. Movement of HAMSs in complex channel and targeted catalysis of ABTS