

Supporting Information

MOF Derived Iron Oxide-based Smart Plasmonic Ag/Au Hollow and Porous Nanoshells “Ultra-Microelectrodes” for Ultra-Sensitive Detection of Arsenic

Zhenlu Zhao,^{*a} Ziwei Zhang,^a Chuanping Li,^b Haoxi Wu,^c Jianrong Wang^a and Yizhong Lu^{*a}

^a School of Material Science and Engineering, University of Jinan, Jinan 250022, Shandong, China.

^b State Key Lab of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, Jilin, China.

^c Institute of Materials, China Academy of Engineering Physics, PO Box 9071-11, Mianyang 621907, Sichuan, China.

E-mail: mse_zhaozl@ujn.edu.cn.

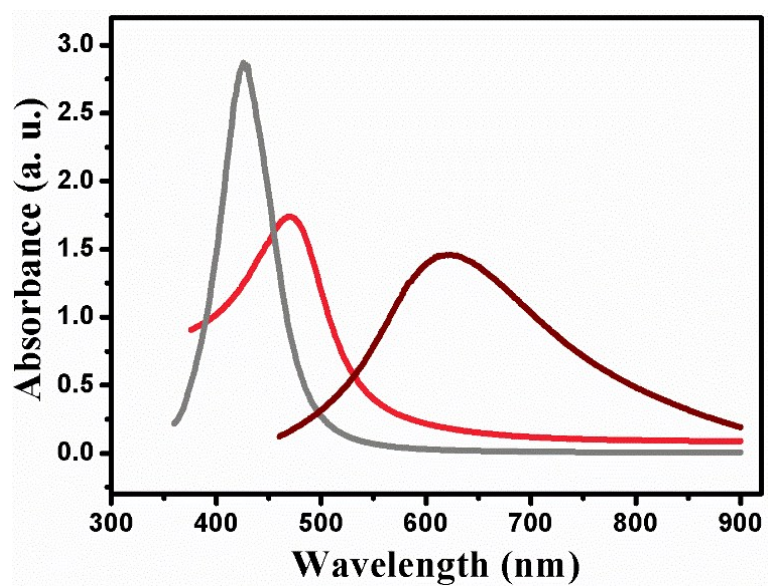


Fig. S1 UV-vis absorption spectra of the Ag NPs (Gray), Ag/Au ANPs (Pink) and Ag/Au HPNSs (Wine).

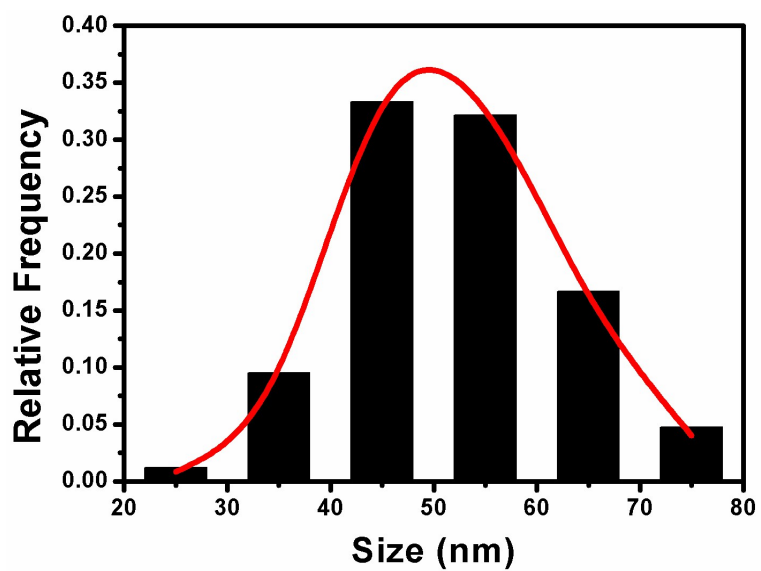


Fig. S2 Histogram of the particle size distribution of the Ag NPs from Fig. 2a.

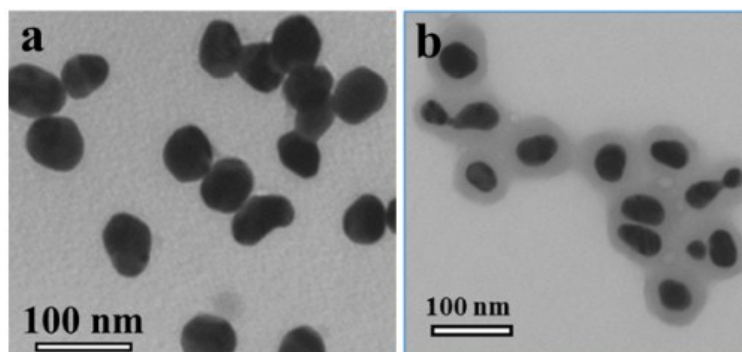


Fig. S3 Typical TEM images of the Ag/Au ANPs and Ag/Au ANPs@MIF-100(Fe).

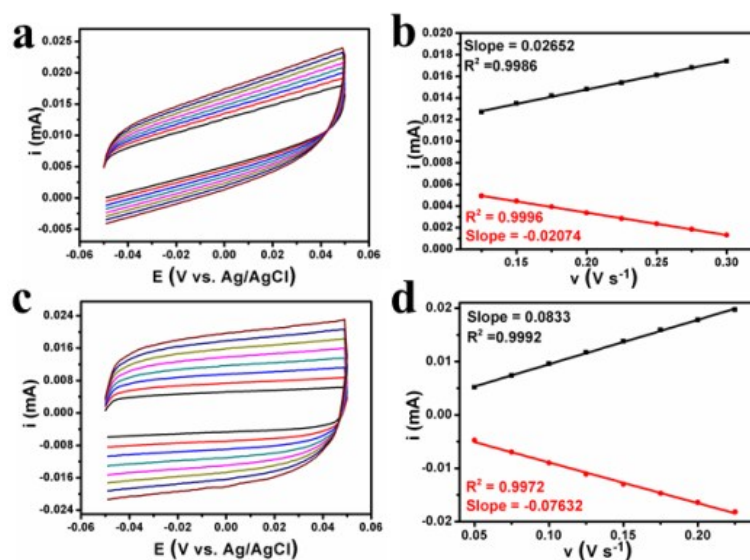


Fig. S4 Charging currents measured in the non-Faradaic potential range of -0.05 V to 0.05V at different scan rates for the Ag/Au ANPs@FO (a) and Ag/Au HPNSs@FO (c), respectively. The cathodic (red) and anodic (black) charging currents measured at 0 V vs Ag/AgCl, plotted against the scan rates for Ag/Au ANPs@FO (b) and Ag/Au HPNSs@FO (d), respectively. The double-layer capacitance determined from this system is taken by the average of the absolute value of anodic and cathodic slopes of the linear fits.

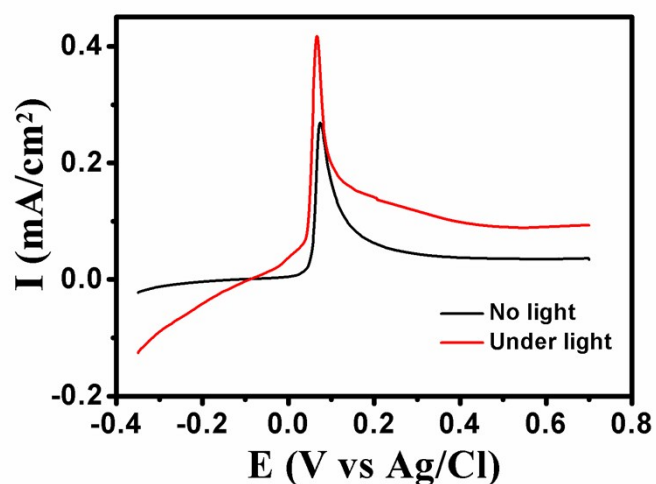


Fig. S5 Stripping voltammogram response of the Ag/Au HPNSs@FO electrode before and after light irradiation in 1 M HCl containing 2 ppb As(III). The current density was normalized to the electrochemically active surface area (ECSA).

Electrode	Electrolyte [pH]	Linear range [ppb]	Sensitivity [$\mu\text{A ppb}^{-1}$]	LOD [ppb]	Reference
Au-NEE	1 M HCl	0-3	3.14	0.02	<i>Anal. Chem.</i> 2008, 80, 4836
Au microdisk	0.1 M HNO ₃	7.5-75	0.363	0.2775	<i>Anal. Chem.</i> 2004, 76, 5051
Au(111)-like polycrystalline Au	0.1 M PBS (pH = 1)	0-1125	0.364	0.28	<i>Anal. Chem.</i> 2010, 82, 9169
Au NPs/GCE	1 M HNO ₃	0.5-15	0.024	0.25	<i>Anal. Chem.</i> 2006, 78, 762
Au/Te GCE	1 M HCl	0.1-10	6.35	0.0026	<i>ACS Appl. Mater. Inter.</i> 2013, 5, 5733
AuNPs-CNTs	0.1 M HCl	0.75-7.5	26.5	0.1	<i>Anal. Chim. Acta</i> 2008, 620, 44
CNT/AuNPs-GC/GCE	1 M H ₂ SO ₄	7.5-375	0.08	2.5	<i>Anal. Chem.</i> 2006, 78, 6102
FePt bimetallic	10 mM PBS	1-15	0.42	0.8	<i>Anal. Chem.</i> 2015, 87, 5546
Fe ₃ O ₄ -RTIL/SPCE	0.1 M acetate buffer (pH = 5.0)	1-10	4.91	0.0008	<i>Anal. Chem.</i> 2013, 85, 2673
C _{0.4} Fe _{2.6} O ₄ nanocubes monolayer	0.1 M acetate buffer (pH = 5.0)	1-20	2.12	0.093	<i>Anal. Chem.</i> 2018, 90, 1263
Au/Ag HPNSs@FO	1 M HCl	0.05-16	922.5	0.05	This work

Table S1 Comparison of electrochemical arsenic performance for the plasmonic Ag/Au HPNSs@FO with other electrocatalysts.