Electronic Supplementary Material (ESI) for Nanoscale

Supporting Information

Coexistence of plasmonic and magnetic properties in $Au_{89}Fe_{11}$ nanoalloys

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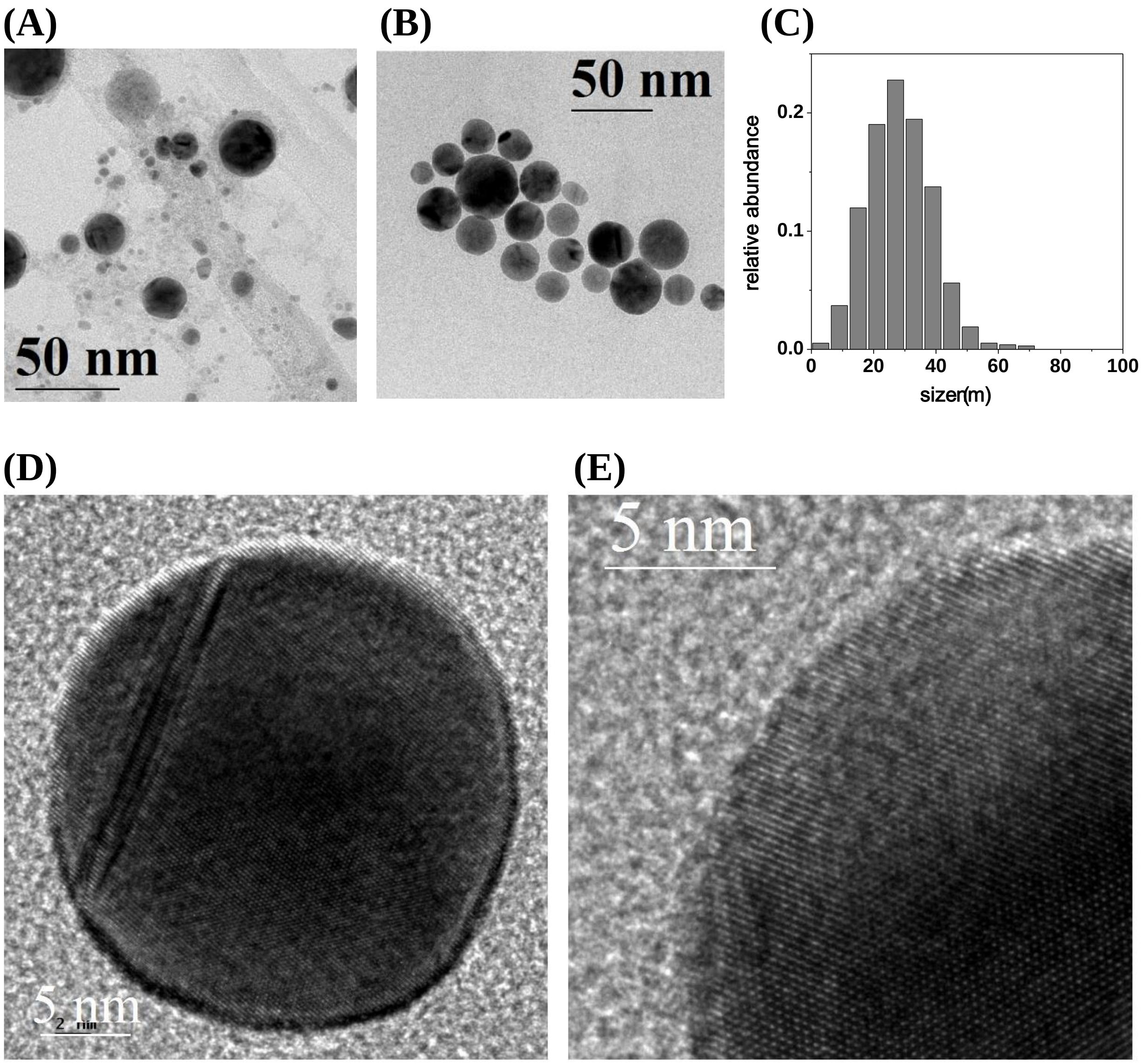

Figure S1. (A-B) Additional TEM images of AuFeNPs as obtained by LASiS in EtOH (A) and after treatment with EDTA and coating with PEG (B). (C) Size histogram of final PEG-AuFeNPs. (D-E) HRTEM images of PEG-AuFeNP.

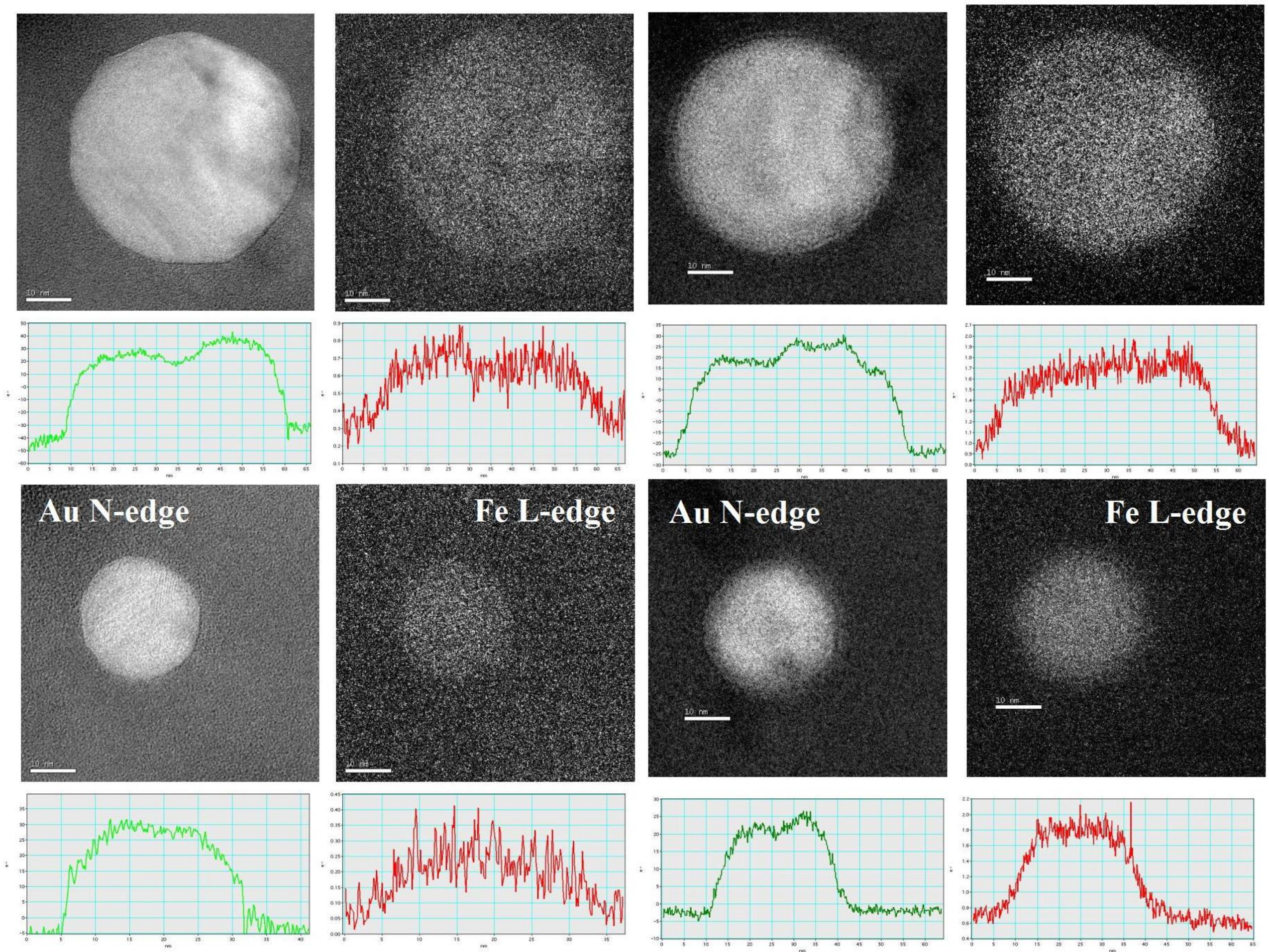

Figure S2. EFTEM mapping of Au N-edge (83 eV) and Fe L-edge (708 eV) on 4 NPs with sizes between 15 and 55 nm, showing that the signals of both elements are well overlapped. The scale bar is 10 nm.

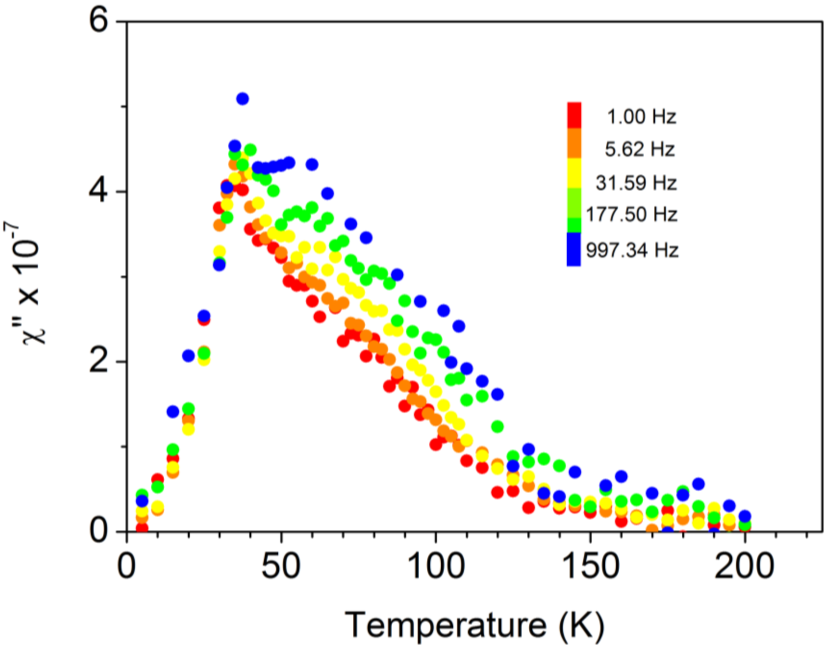

Figure S3. Temperature dependence of the out-of-phase component of the AC magentic susceptibility measured at five differnet log-spaced frequencies between 1 and 1000 Hz. Although a freqeuncy dependence is clearly observed, the large noise prevents any reliable quantitative data analysis.

Table S1. Calibration curve calibration curve used to evaluate the Fe loading of the alloy. According to the following files for $Au_{1-x}Fe_x$ alloys, we obtained the calibration curve to evaluate the Fe loading of the alloy:

x	pdf file	structure	cell parameter (Å)
0	pdf 00-004-0784	fcc	4.079
0.01	pdf 00-040-1295	fcc	4.073
0.4	pdf-04-005-6758	fcc	3.946
0.5	pdf 03-065-9857	fcc	3.885
0.5	pdf 04-001-2773	fcc	3.89
0.9	pdf 03-065-9856	fcc	3.68
0.92	pdf 04-001-2774	fcc	3.68
0.95	pdf 01-072-5264	bcc	2.892
0.96	pdf 04-004-4296	bcc	2.888
1	pdf-00-006-0696	bcc	2.886
1	pdf-04-007-9753	bcc	2.865
1	pdf-04-014-0360	bcc	2.868

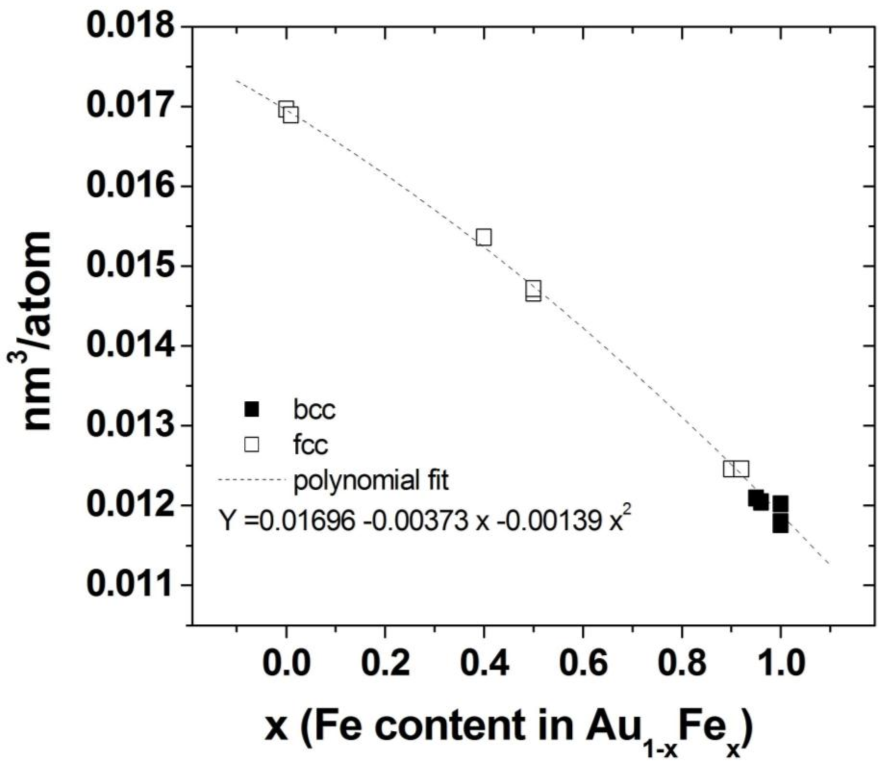

Figure S4. The calibration curve used to evaluate the Fe loading of the alloy. To take into account $Au_{1-x}Fe_x$ solid solutions with different structures (bcc and fcc), the calibration is obtained by fitting the average volume per atom in the cell.