Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

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Table with all parameters of the MICS for the growth of pure Au and TiO_x NPs and core@shell, Au@TiO_x nanoparticles.

Even though only two of the three magnetrons were turned on for the fabrication of the NPs, Ar was also introduced through the third magnetron, M3.

	Au NPs	TiO_x NPs	Au@TiO_x NPs
Au power (W)	6	-	6
Au Voltage / Current (V / mA)	250 / 23	-	250 / 23
Ti power (W)	-	11	11
Ti Voltage / Current (V / mA)	-	164 / 67	164 / 67
Au Ar flux (sccm)	20	20	20
Ti Ar flux (sccm)	20	20	20
M3 Ar flux (sccm)	30	30	30
Au Distance to exit slit (mm)	120	120	120
Ti Distance to exit slit (mm)	90	90	90
M3 Distance to exit slit (mm)	120	120	120
Deposition time on Si wafer (min)	4	4	2
Coverage on Si wafer (NPs/μm^2)	100	90	20
Deposition rate on Si wafer (NPs/μm^2.min)	26	22	11
Deposition time on TEM grid (s)	80	80	185
Coverage on TEM grid (NPs/μm^2)	39	8	29
Deposition rate on TEM grid (NPs/μm^2.min)	29	6	9

Table 1: Working parameter of the MICS.

During the depositions, both the water cooling of the magnetrons and the aggregation zone walls was fixed to 10 ºC and regulated by a chiller.

STEM images of pure Au nanoparticles recorded at different times.

Since the electron beam can induce structural changes, the current beam is adjusted in such a way that the nanoparticles are not altered during the acquisition time. This is demonstrated in the figure below where it can be observed that there is no change in NPs structure over acquisition time.

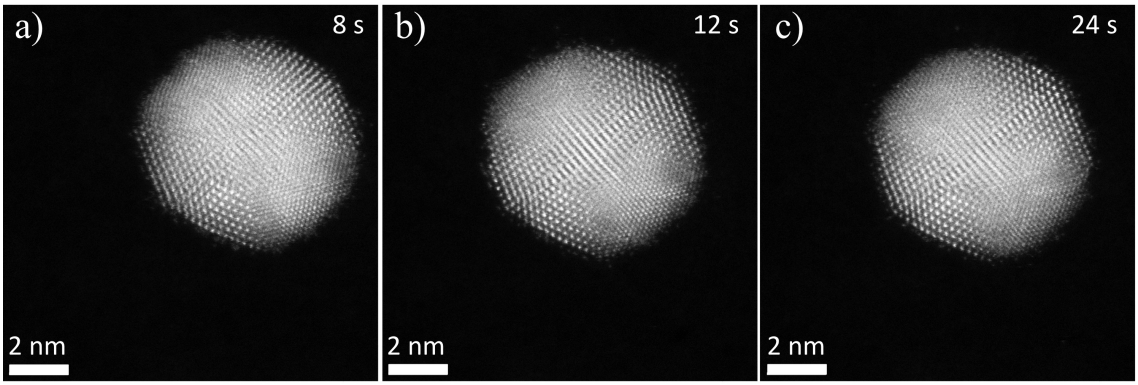

Figure S1: STEM images of Au nanoparticles recorded at (a) 8 s, (b) 12 s, and (c) 24 s.

STEM images of pure Au nanoparticles recorded at different magnifications.

The figure below, illustrates the homogeneity of the deposits of Au NPs on TEM grids.

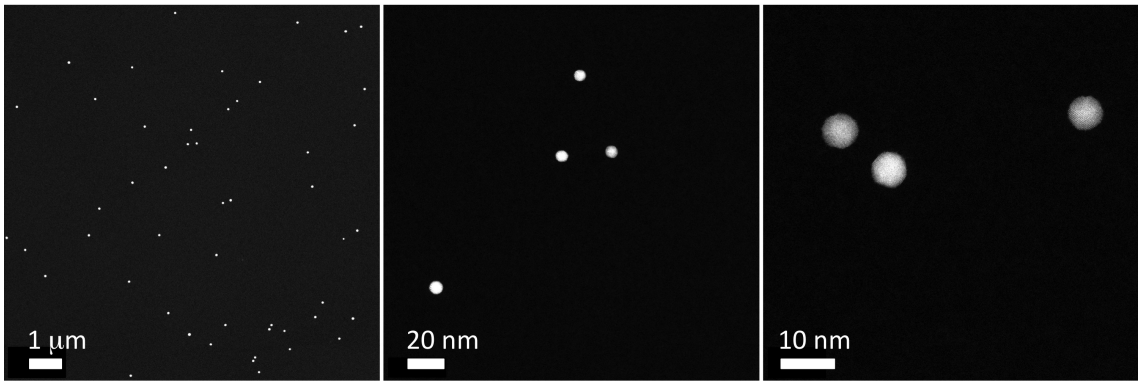

Figure S2: STEM images of Au nanoparticles recorded at different magnifications.

EELS spectrum extracted from TiO_x nanoparticles.

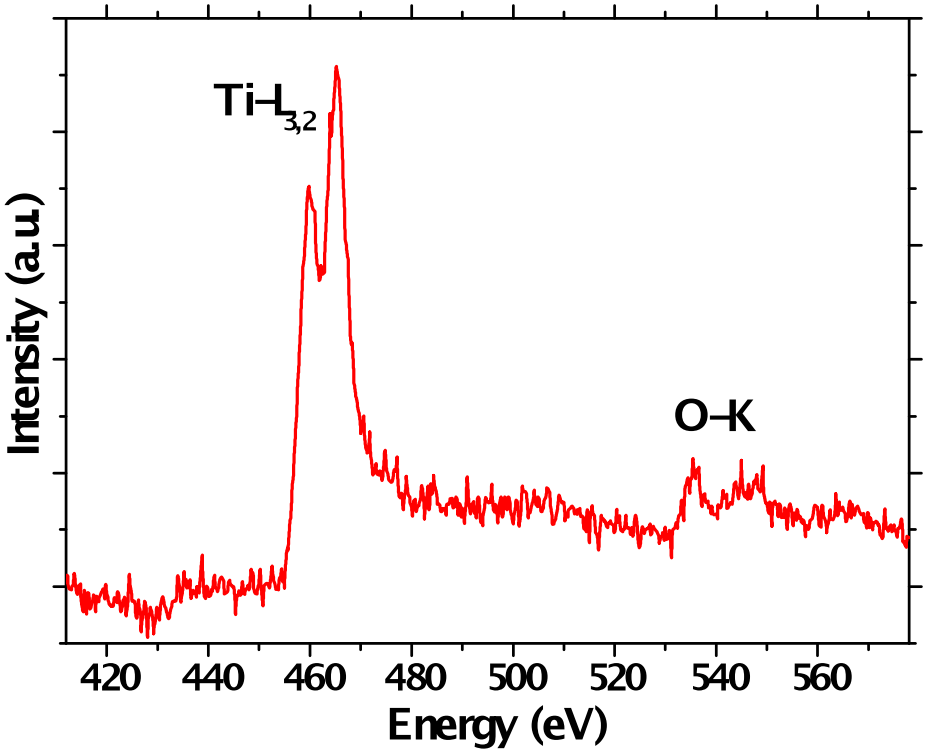

Figure S3: EELS spectrum extracted from the spectrum image presented in figure 4 of manuscript. Both edges Ti-$L_{3,2}$ and O-K are clearly observed.

STEM images of Au@TiO_x nanoparticles recorded at different magnifications.

The figure below, illustrates the homogeneity of the deposits of Au@TiO_x NPs on TEM grids. At moderate magnification, the core@shell structure appears evident from the different contrasts. Also it clearly appears that all NPs have the Au@TiO_x structure.

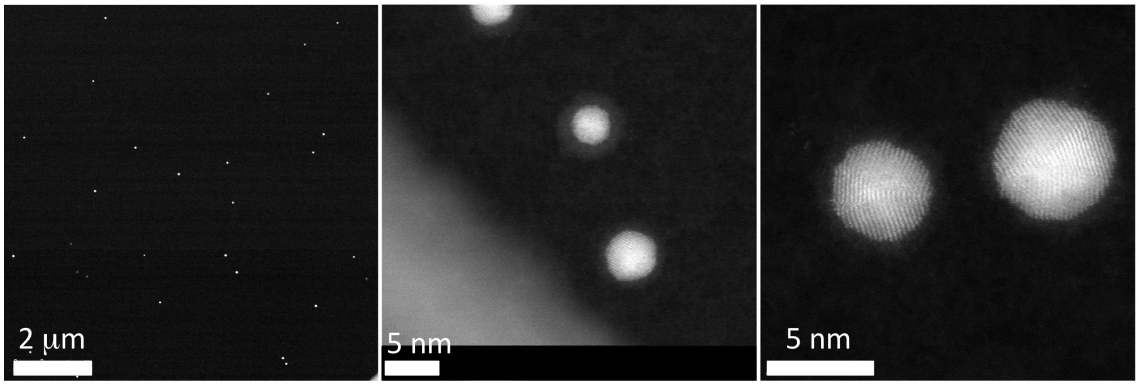

Figure S4: STEM images of Au@TiO_x nanoparticles recorded at different magnifications.

EDS and EELS spectra for Au@TiO_x nanoparticles.

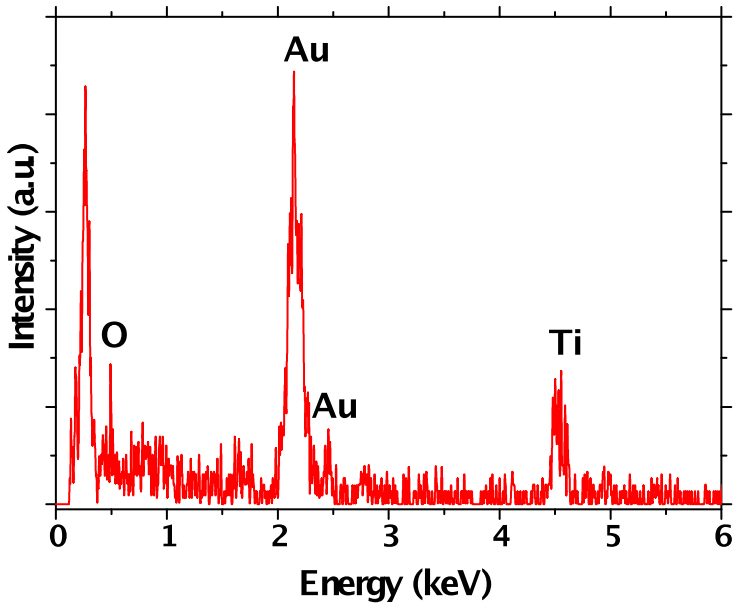

Figure S5: EDS profile of Au@TiO_x NPs confirming the presence of Au core and Ti shell, which has been slightly oxidized.

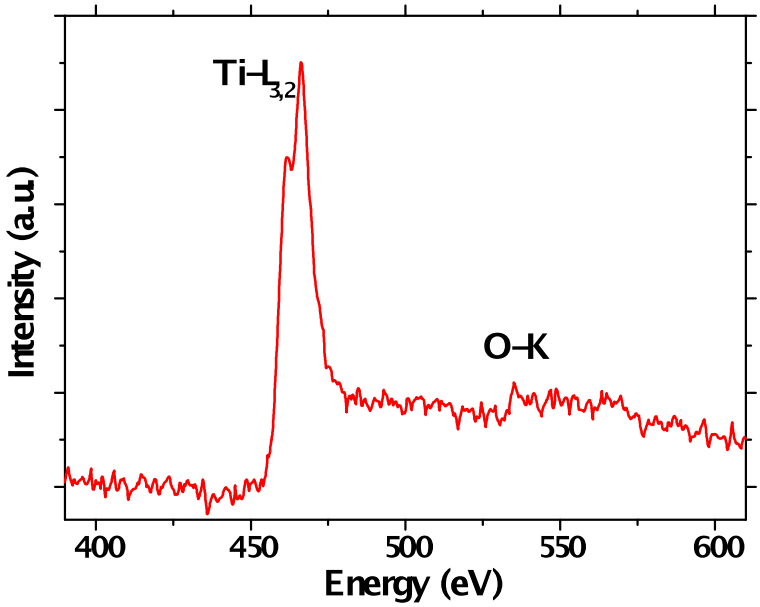

Figure S6: EELS spectrum obtained from the spectrum image presented in figure 5 (c).