

## Supporting Informations

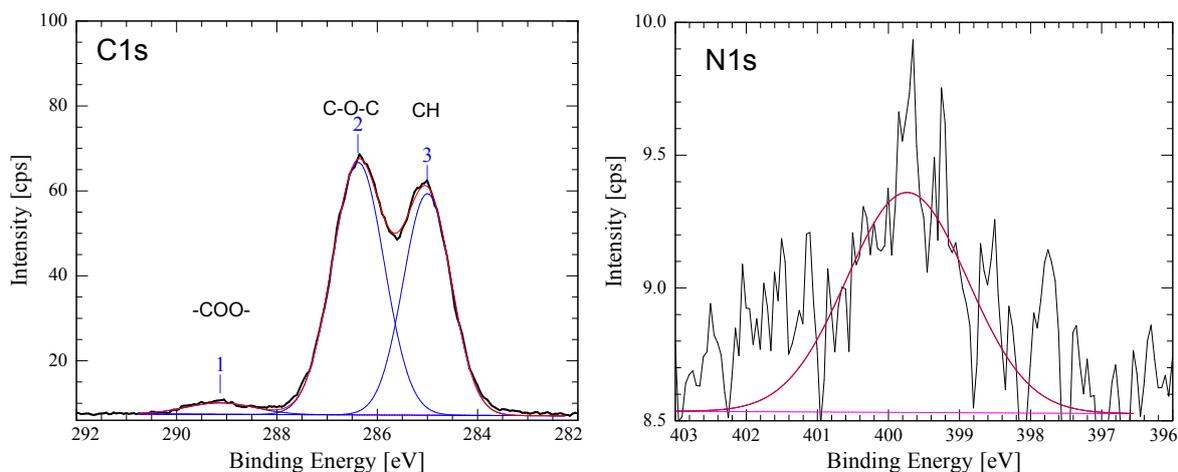
# One step synthesis of magnetic gold nanostars for bioimaging applications

L. Minati<sup>1</sup>, V. Antonini<sup>2</sup>, L. Dalbosco<sup>3</sup>, F. Benetti<sup>3</sup>, C. Migliaresi<sup>3</sup>, M. Dalla Serra<sup>2</sup>, G. Speranza<sup>1</sup>

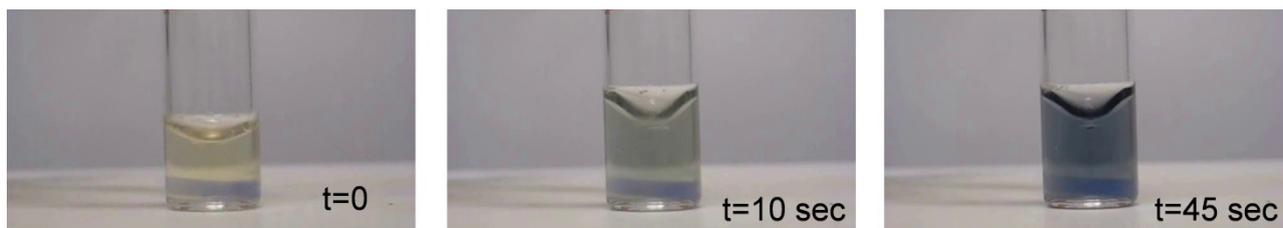
<sup>1</sup> FBK, Via Sommarive 18, 38123 Trento, Italy

<sup>2</sup>Istituto di Biofisica, Consiglio Nazionale delle Ricerche, via alla Cascata 56/C, 38123 Trento, Italy

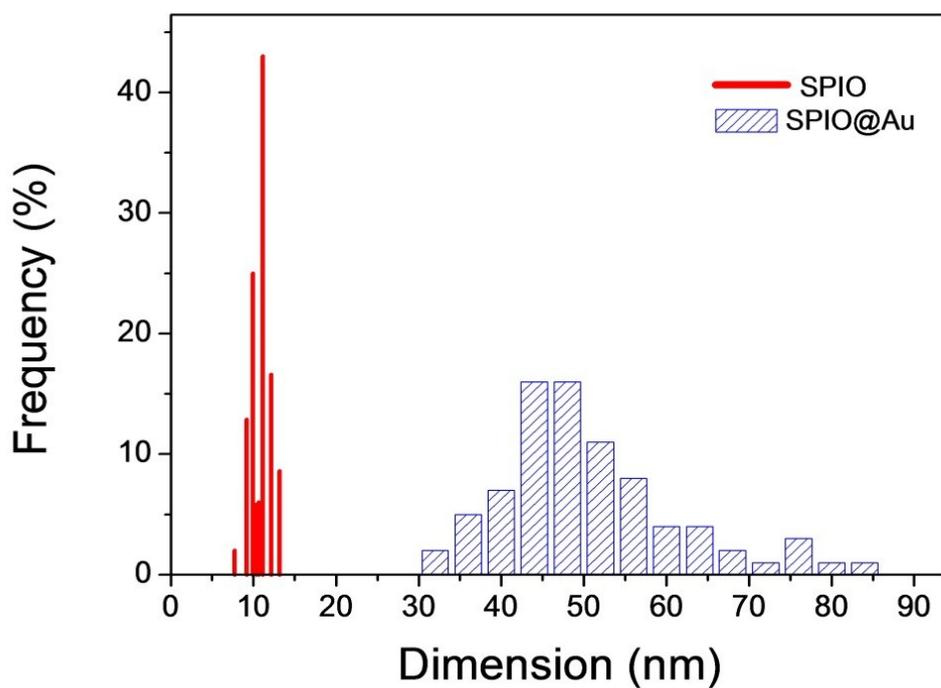
<sup>3</sup>Department of Industrial Engineering & Biotech Research Center, University of Trento, via delle Regole 101, 38123 Mattarello, Trento



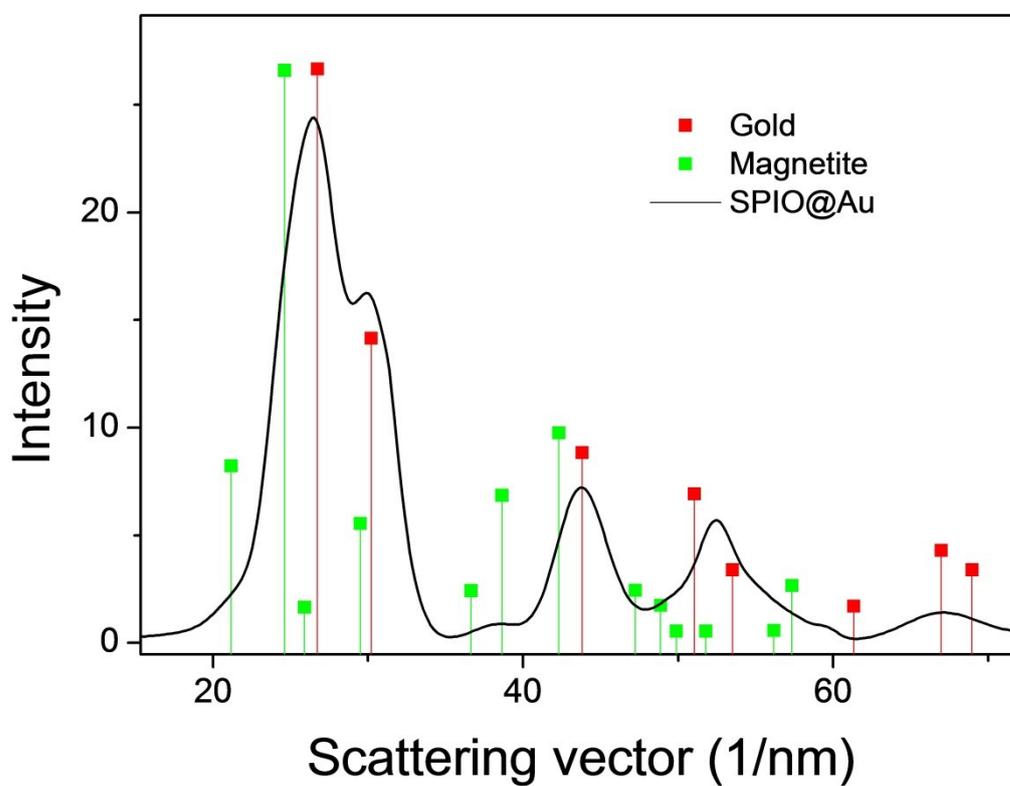
**Fig. S1.** XPS analysis of SPIO-PEG nanoparticles. C1s (**left**) and N1s (**right**) core line analysis.



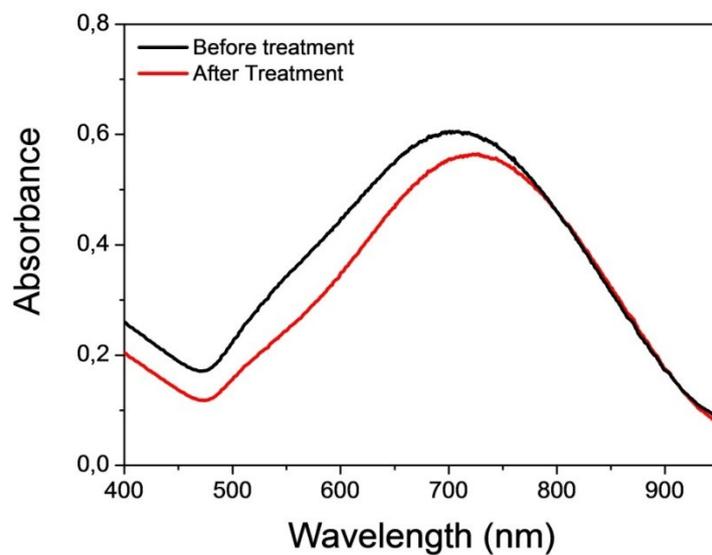
**Fig. S2.** Images timelapse of the synthesis of the SPIO@Au NPs.



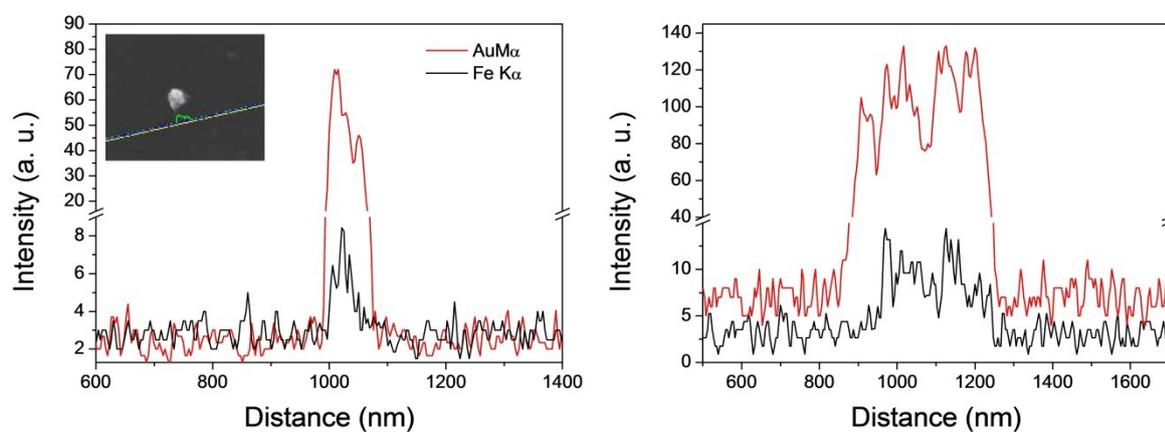
**Fig. S3.** TEM numerical size distribution of SPIO-PEG and SPIO@Au NPs.



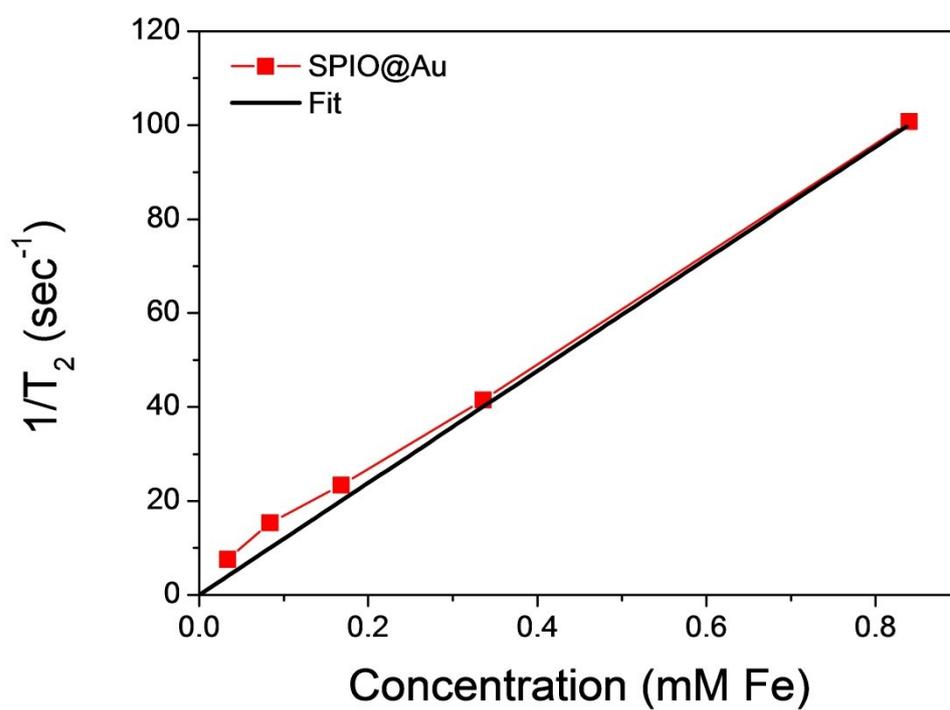
**Fig. S4.** Selected Area Electron Diffraction analysis of SPIO@Au NPs as well as the principal magnetite (green) and gold (red) diffraction lines.



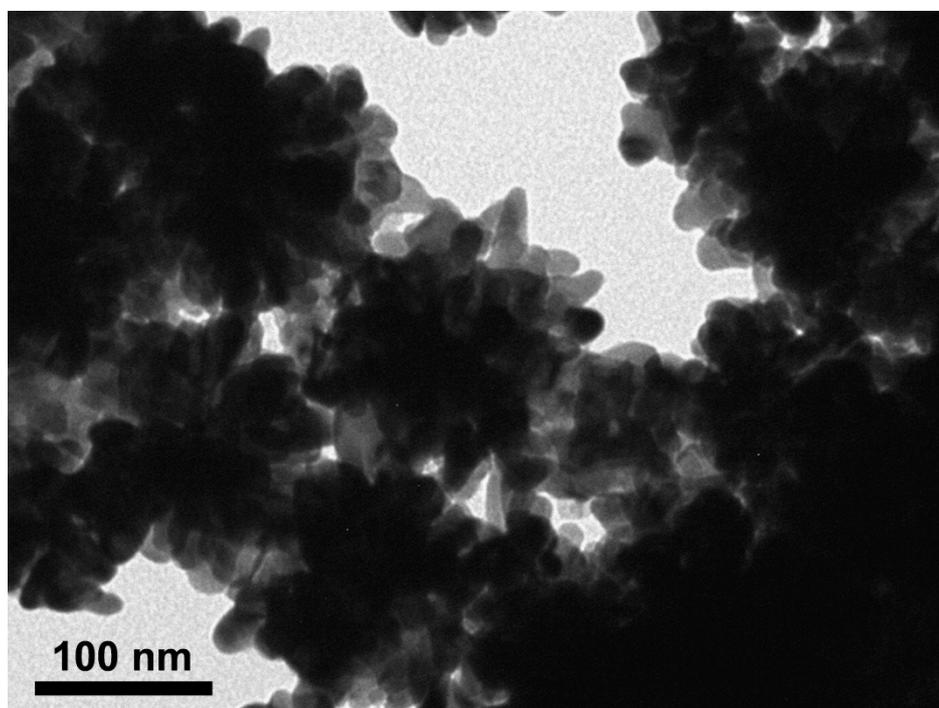
**Fig. S5. (Top)** Uv-Vis analysis SPIO@Au and acid-etched SPIO@Au NPs. **(Bottom)** Nanoparticles were incubated in 1M HCL solution for 24 hrs, centrifuged three times and magnetically separated.



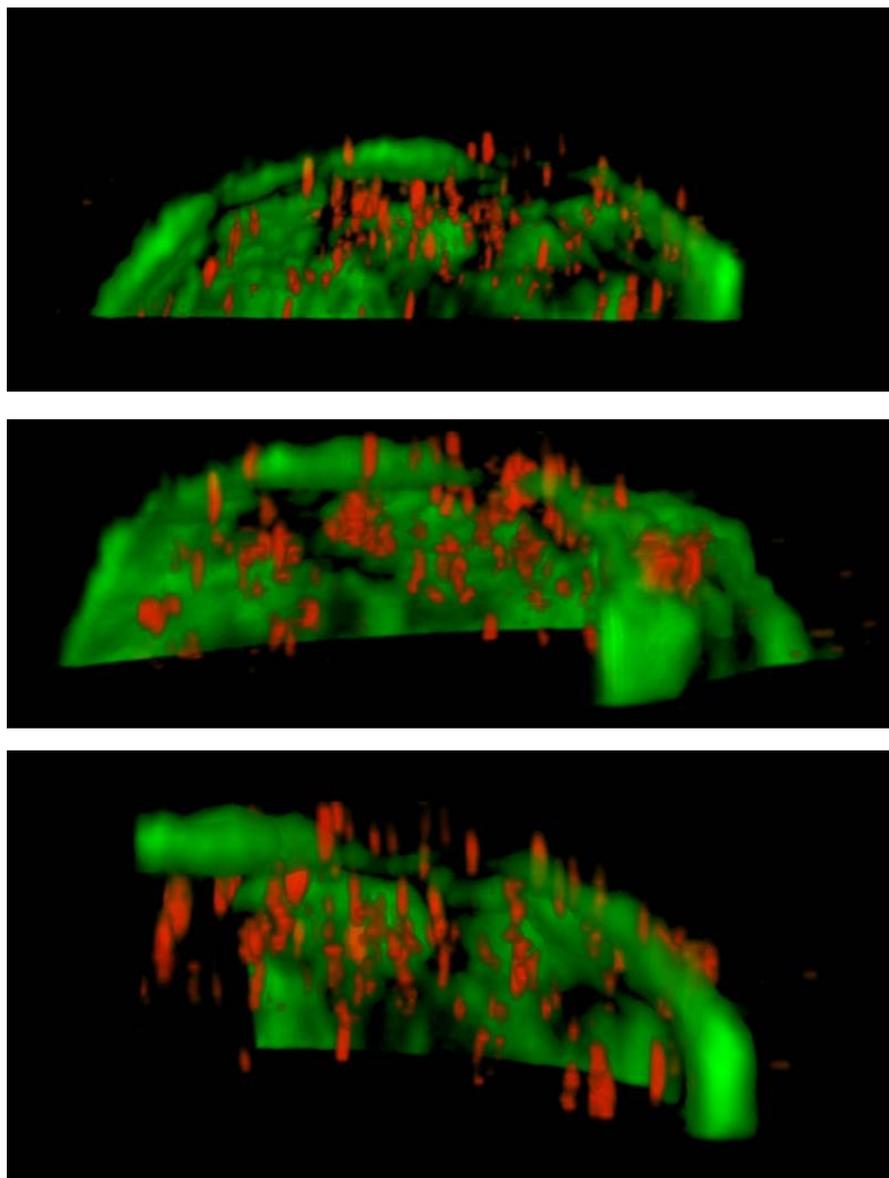
**Fig. S6.** Fe K $\alpha$  and Au M $\alpha$  EDXS line-scan measurements of a single SPIO@Au nanoparticle (**left**) and multiple SPIO@Au NPs (**right**) deposited on silicon substrate.



**Fig. S7.** Plot of the reciprocal of the relaxation time  $T_2$  of SPIO@Au NPs in water as a function of the iron oxide concentration.



**Fig. S8.** Transmission electron microscopy analysis of SPIO@Au NPs synthesized at with 3 mM  $Au^{3+}$  concentration.



**Fig. S9.** 3D projection of a confocal z-stack of A549 cancer cell line incubated with SPIO@Au-PEG for 2 h.