

SUPPLEMENTARY MATERIALS

# Silver nanoparticles functionalized by Fluorescein isothiocyanate or Rhodamine B isothiocyanate: fluorescent and plasmonic materials

Ilaria Fratoddi <sup>1</sup>, Chiara Battocchio <sup>2</sup>, Giovanna Iucci <sup>2</sup>, Daniele Catone <sup>3</sup>, Antonella Cartoni <sup>1</sup>, Alessandra Paladini <sup>4</sup>, Patrick O'Keeffe <sup>4</sup>, Silvia Nappini <sup>5</sup>, Sara Cerra <sup>1</sup>, and Iole Venditti <sup>2\*</sup>

Dept. of Chemistry, Sapienza University of Rome, P.le A. Moro, 5, 00185 Rome, IT; [ilaria.fratoddi@uniroma1.it](mailto:ilaria.fratoddi@uniroma1.it); [antonella.cartoni@uniroma1.it](mailto:antonella.cartoni@uniroma1.it); [sara.cerra@uniroma1.it](mailto:sara.cerra@uniroma1.it)

<sup>2</sup> Dept. of Sciences, Roma Tre University Via della Vasca Navale 79, 00146 Rome, IT; [chiara.battocchio@uniroma3.it](mailto:chiara.battocchio@uniroma3.it); [giovanna.iucci@uniroma3.it](mailto:giovanna.iucci@uniroma3.it); [iole.venditti@uniroma3.it](mailto:iole.venditti@uniroma3.it)

<sup>3</sup> Istituto di Struttura della Materia-CNR (ISM-CNR), Division of Ultrafast Processes in Materials (FLASHit), 100 Via del Fosso del Cavaliere 100, Rome, 00133, Italy; [daniele.catone@cnr.it](mailto:daniele.catone@cnr.it)

<sup>4</sup> Istituto di Struttura della Materia-CNR (ISM-CNR), Division of Ultrafast Processes in Materials (FLASHit), Monterotondo Scalo, 00015, Italy; [alessandra.paladini@cnr.it](mailto:alessandra.paladini@cnr.it); [patrick.okeeffe@ism.cnr.it](mailto:patrick.okeeffe@ism.cnr.it)

<sup>5</sup> IOM CNR, Laboratorio TASC, S.S. 14 Km 163.5 AREA Science Park Basovizza, Trieste 34149, Italy; [nappini@iom.cnr.it](mailto:nappini@iom.cnr.it)

\* Correspondence: [iole.venditti@uniroma3.it](mailto:iole.venditti@uniroma3.it); Tel.: +39-06-5733-3388

Table S1 a,b): Main characterizations of AgNPs-FITC and AgNPs-RITC synthesized using different Ag precursor/dye m/m ratios.

(a)	Ag/FITC = 1 / 2 (m/m)	Ag/FITC = 1/1 (m/m)	Ag/FITC = 1/0.1 (m/m)
$\lambda_{\max}$ (nm)	-	398, 474	400,480
$\langle 2R_H \rangle$ (nm)	polydispersed	78± 12	400±70
Yield (%)	60%	55%	15%

(b)	Ag/RITC = 1 / 2 (m/m)	Ag/RITC = 1/1 (m/m)	Ag/RITC = 1/0.1 (m/m)
$\lambda_{\max}$ (nm)	-	414,560	413,550
$\langle 2R_H \rangle$ (nm)	polydispersed	68± 20	400±20
Yield (%)	40%	30%	15%

Table S2. Measurements were carried out at C1s, S2p, N1s, O1s and Ag3d core levels; all data analysis results (Binding Energy – BE -, Full Width Half Maximum – FWHM – Atomic Ratio values and proposed assignments); the statistical incertitude in semiquantitative evaluation by XPS is estimated as 5% of the calculated value [1]

<b>Table S1.</b> XPS data analysis results: Binding Energy – BE -, Full Width Half Maximum – FWHM – Atomic Ratio values and proposed assignments.						
Sample	Signal	BE (eV)	FWHM (eV)	Exp. Atomic ratio	Assignment	
AgNPs-FITC	C1s	284.70	1.11	7.5	C-C	
		285.84	1.11	1.0	C-N, -N=C=S	
		286.43	1.11	1.2	C-O	
		287.66	1.11	0.5	C=O	
		288.84	1.11	-	COOH (impurities)	
	S2p3/2	161.50	0.73	3.9	-N=C=S	
		162.42	0.73	1.0	-S-Ag	
	N1s	398.40	1.72	1.0	-N=C=S	
	Ag3d5/2	367.84	0.68	14.6	Ag(0)	
		368.79	0.68	1.0	Ag( $\delta^+$ )	
	O1s	531.00	2.01	0.6	C=O, C-O-C	
		532.89	2.01	1.0	C-OH	
	AgNPs-RITC	C1s	284.70	1.31	20.9	C-C
			285.80	1.31	8.1	C-N, -N=C=S
286.78			1.31	3.4	C-O	
287.85			1.31	2.0	C=O	
288.92			1.31	1.0	COOH	
S2p3/2		161.59	1.98	1.5	-N=C=S	
		164.13	1.98	1.0	-S-Ag	
N1s		398.48	1.55	5.5	-N=C=S; -NR <sub>2</sub>	

		400.48	1.55	1.0	-NR <sub>2</sub> H <sup>+</sup>
	Ag3d5/2	367.80	0.68	2.7	Ag(0)
		368.45	0.68	1.0	Ag( $\delta^+$ )
	O1s	531.06	2.45	1.0	C=O
		533.32	2.45	4.7	C-OH, C-O-C
* Intensity ratios: for AgNPs-FITC are calculated as "signal intensity/C-N, SCN signal intensity"; for AgNPs-FITC are calculated as "signal intensity/COOH signal intensity"					

[1] Swift, P.; Shuttleworth, D.; Seah, M. P. Practical Surface Analysis by Auger and X-ray Photoelectron Spectroscopy, Briggs, D.; Seah, M. P. Eds.; J. Wiley & Sons, Chichester, 1983 chapter 4

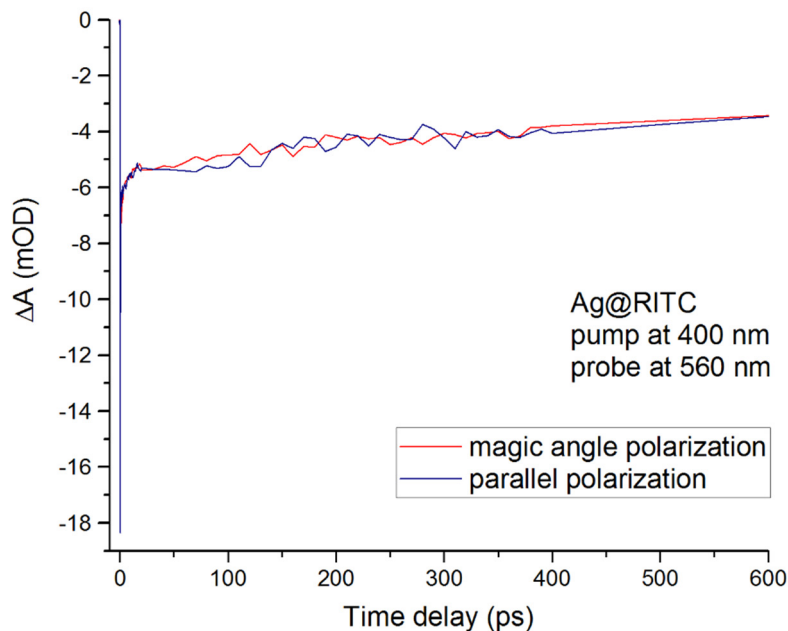


Figure S1. Dynamics of the fluorescence of the RITC dye molecules in the AgNPs – RITC sample when excited at 400 nm (on the LSPR of the AgNPs). The lack of difference between the parallel (blue line) and magic angle (red line) polarizations of the pump probe signals is indicative of hindered rotation of the dye molecule.