

# Supporting Information

## Adsorption of a Protein Monolayer via Hydrophobic Interactions Prevents Nanoparticle Aggregation under Harsh Environmental Conditions

Sergio Dominguez-Medina,<sup>1</sup> Jan Blankenburg,<sup>1</sup> Jana Olson,

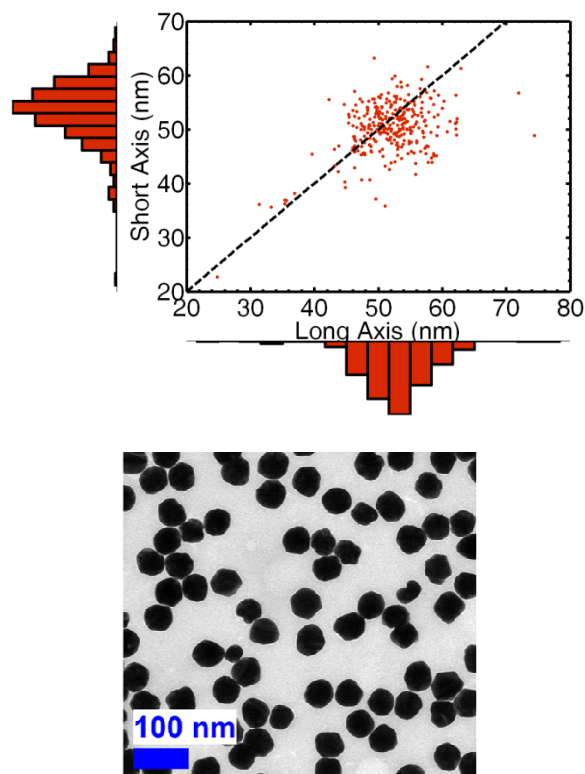
Christy F. Landes<sup>1\*</sup> and Stephan Link<sup>1,2\*</sup>

<sup>1</sup>Department of Chemistry, <sup>2</sup>Department of Electrical and Computer Engineering

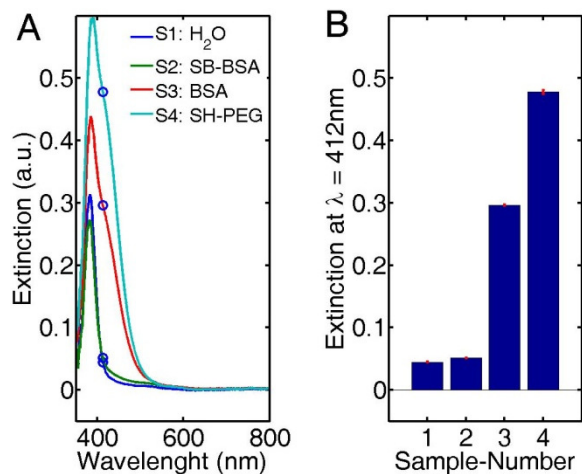
Laboratory for Nanophotonics, Rice University, Houston, Texas 77005

\*Corresponding authors, email: [cflandes@rice.edu](mailto:cflandes@rice.edu) [slink@rice.edu](mailto:slink@rice.edu)

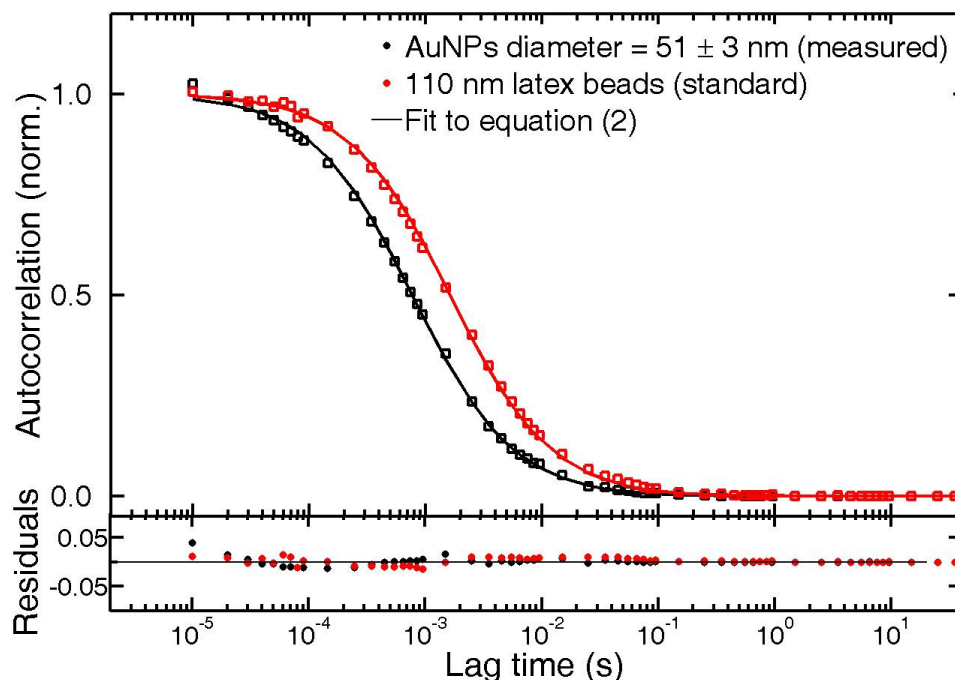
This document contains information and figures regarding the size distributions of 51 nm AuNPs obtained using TEM images, Ellman's reagent assay for thiol activity of BSA and SB-BSA along with positive and negative controls, autocorrelation traces of 50 nm AuNPs and 110 nm latex beads used as calibration standard for correlation spectroscopy experiments, characteristic diffusion times and hydrodynamic dimensions of 50 nm AuNPs and 110 nm latex beads, UV/Vis ensemble extinction measurements of AuNPs in ZnCl<sub>2</sub> and CaCl<sub>2</sub>, and BSA-coated AuNPs in NaCl, PBS and TBS.



**Figure S1.** Top: Size distribution obtained from TEM images containing 351 individual AuNPs yields an average diameter of  $51 \pm 7$  nm. The dashed line represents the aspect ratio of 1 (perfect spherical shape) and is shown as a guide to the eye only. Bottom: Representative TEM image.



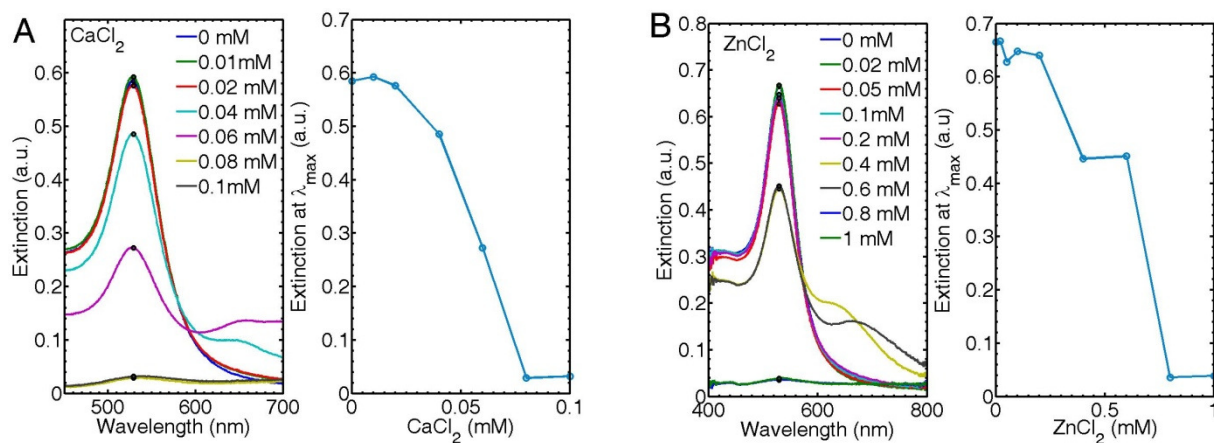
**Figure S2.** (A) UV/Vis extinction of Ellman's reagent upon reacting with H<sub>2</sub>O, sulfhydryl-blocked BSA (SB-BSA), BSA and thiol-PEG (SH-PEG). (B) Extinction at 412 nm extracted from the spectra shown in (A). Note that 412 nm is the wavelength used in Ellman's original paper (ref. 62 of the main paper) to quantify the thiol-activity of tissues and biomolecules.



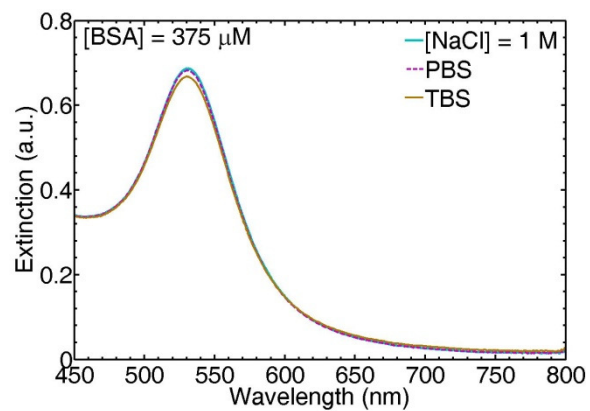
**Figure S3.** Autocorrelation traces of 110 nm latex beads used for calibration of the focal volume (red squares) and 51 nm AuNPs (black squares). The solid lines represent the fit to equation (2). The size of the AuNPs extracted from the scattering correlation analysis agrees with the value obtained from TEM.

**Table S1.** Characteristic diffusion time and hydrodynamic radii extracted from Figure S2.

| Sample             | $\tau_D$ (ms)   | $R_h$ (nm)  |
|--------------------|-----------------|-------------|
| 51 nm AuNPs        | $0.75 \pm 0.05$ | $26 \pm 2$  |
| 110 nm latex beads | $1.61 \pm 0.2$  | 110 (fixed) |



**Figure S4.** UV/Vis extinction spectroscopy of citrate-stabilized AuNPs in the presence of increasing concentrations of  $\text{CaCl}_2$  (A) and  $\text{ZnCl}_2$  (B).



**Figure S5.** UV/Vis extinction spectra of BSA-stabilized AuNPs in the presence of 1 M NaCl (solid cyan line), PBS (dashed magenta line) and TBS (solid brown line)