Supporting Information

The influence of PEGylated gold nanoparticles on the solidification of alcohols

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Supporting Information content:

(1) Hydrostatic limits of the $d = 20$ nm AuNS EtOH and $d = 12$ and 28 nm AuNS MeOH-EtOH 4:1 colloids.

Table S1. Hydrostatic limits of $d = 20$ nm AuNS EtOH colloid for the different gold molar concentrations. Errors correspond to the standard deviations derived from the three runs for each molar concentration.

[Au] (mM)	$P_{h,1}$ (GPa)	$P_{h,2}$ (GPa)	$P_{h,3}$ (GPa)	**<P_h> (GPa)**	**ΔP_h (GPa)**
0	3.7	3.6	3.6	**3.6**	**0.1**
2.6	3.2	3.2	3.3	**3.3**	**0.1**
5.2	3.0	3.2	3.1	**3.1**	**0.1**
7.7	2.9	3.0	2.6	**2.8**	**0.2**
10.4	2.5	2.9	2.6	**2.7**	**0.2**

Table S2. Hydrostatic limits of $d = 12$ nm AuNS MeOH-EtOH 4:1 colloid for different gold molar concentrations. Errors correspond to the standard deviations derived from the three runs for each molar concentration.

[Au] (mM)	$P_{h,1}$ (GPa)	$P_{h,2}$ (GPa)	$P_{h,3}$ (GPa)	**<P_h> (GPa)**	**ΔP_h (GPa)**
0	11.1	10.8	10.8	**10.9**	**0.2**
3.2	10.0	10.6	10.5	**10.4**	**0.3**
6.4	10.4	9.9	9.8	**10.0**	**0.3**
12.7	9.2	9.2	9.1	**9.2**	**0.1**

Table S3. Hydrostatic limits of $d = 28$ nm AuNS MeOH-EtOH 4:1 colloid for different gold molar concentrations. Errors correspond to the standard deviations derived from the three runs for each molar concentration.

[Au] (mM)	$P_{h,1}$ (GPa)	$P_{h,2}$ (GPa)	$P_{h,3}$ (GPa)	**<P_h> (GPa)**	**ΔP_h (GPa)**
0	11.1	10.8	10.8	**10.9**	**0.2**
2.5	10.3	10.6	10.4	**10.4**	**0.2**
5.0	10.6	10.0	10.0	**10.2**	**0.2**
7.4	9.4	10	9.8	**9.7**	**0.3**
9.9	9.6	9.6	9.0	**9.4**	**0.2**

(2) Variation of the number of PEG-SH molecules at the surface of AuNS with its diameter.

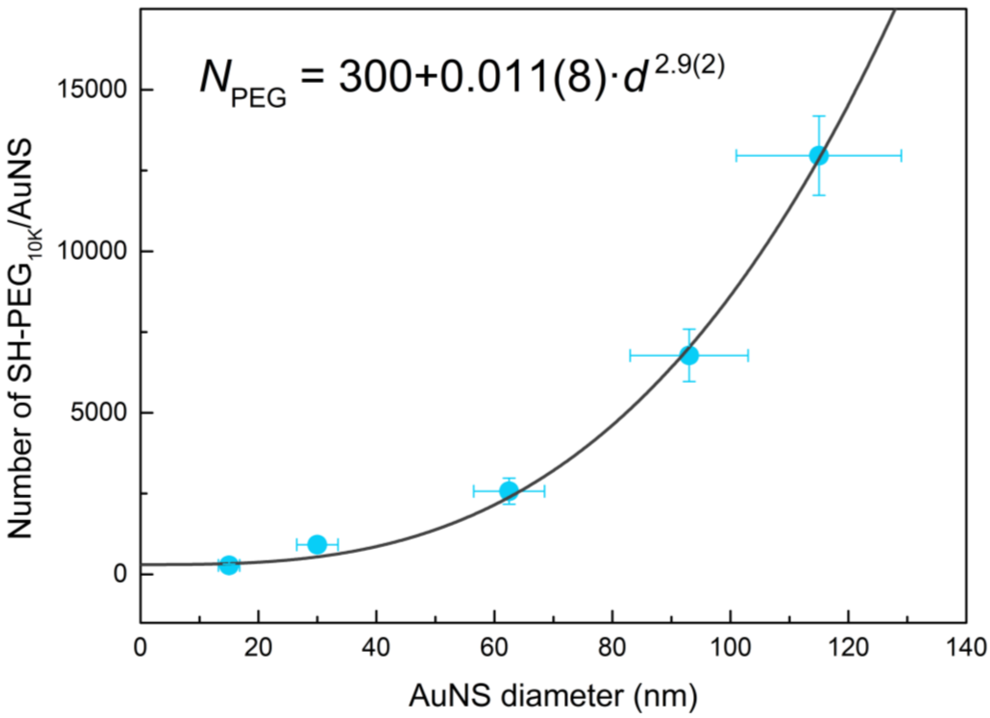

Figure S1. Variation of the number of PEG_{10K}-SH molecules as a function of the nanosphere diameter. Filled circles correspond to previously reported experimental data by Rahme *et al.* [1]. Solid line corresponds to the fitting of the data to the equation indicated on figure.

(3) EtOH Raman spectroscopy measurements.

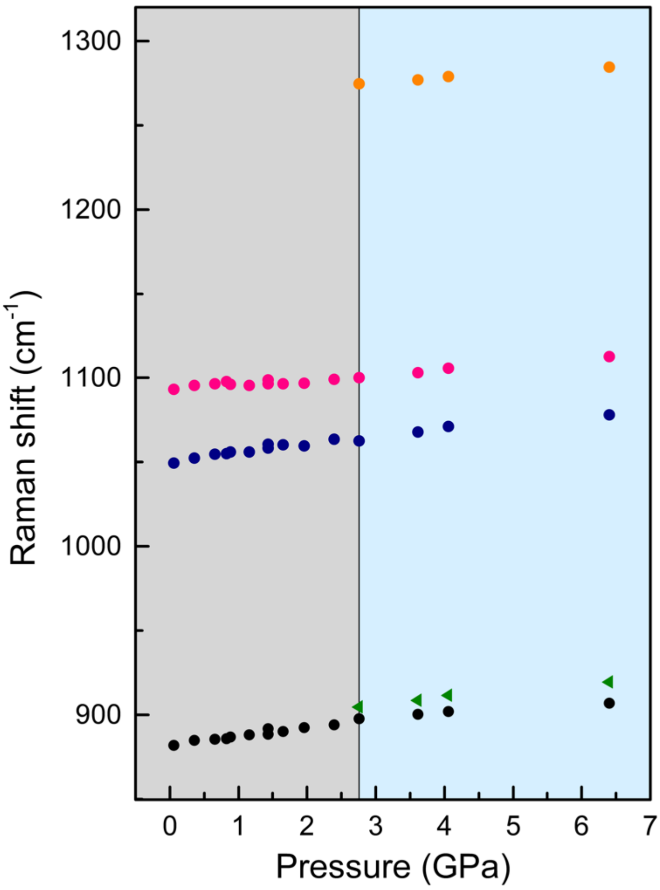

Figure S2. Variation of different Raman vibrational frequencies of ethanol with pressure at room-temperature. Note the early crystallization of EtOH at 2.8 GPa due to the application of pressure without stabilization time between steps.

(4) Confidence ellipses in K_0 and K_0' parameter space for the EtOH EOS fits.

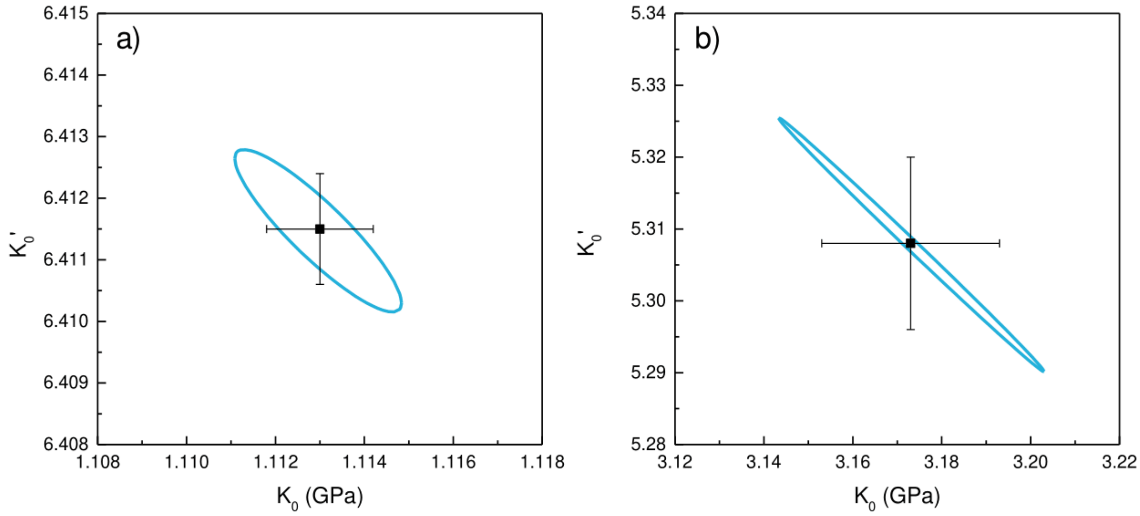

Figure S3. Confidence ellipses in K_0 and K_0' parameter space for the a) liquid and b) crystalline phases of EtOH obtained through EOS EosFit7-GUI [2], using a third-order Murnaghan EOS [3] and third-order Birch-Murnaghan EOS [4] for the liquid and crystalline phases, respectively.

References

[1] Rahme, K.; Chen, L.; Hobbs, R. G.; Morris, M. A.; O'Driscoll, C.; Holmes, J. D. PEGylated gold nanoparticles: polymer quantification as a function of PEG lengths and nanoparticle dimensions. *RSC Adv*. **2013**, 3, 6085-6094.

[2] Gonzalez-Platas, J.; Alvaro, M.; Nestola, F.; Angel, R. EosFit7-GUI: a new graphical user interface for equation of state calculations, analyses and teaching. *J. App. Cryst.* **2016**, 49, 1377-1382.

[3] Murnaghan, F. D. The compressibility of media under extreme pressures. *Proc. Natl. Acad. Sci. U.S.A.* **1944**, 30, 244-247.

[4] Birch, F. Finite elastic strain of cubic crystals. *Phys. Rev*, **1947**, 71, 809.