

Electronic Supplementary Information

Direct observation of liquid pre-crystallization intermediates during the reduction of aqueous tetrachloroaurate by sulfide ions

Yuri Mikhlin^{*a}, Anton Karacharov^a, Maxim Likhatski^a, Tatyana Podlipskaya^b, Ivo Zizak^c

^a Institute of Chemistry and Chemical Technology of Siberian Branch of Russian academy of sciences, Akademgorodok, 50/24, Krasnoyarsk, 660036, Russia

^b Nikolayev Institute of Inorganic Chemistry SB RAS, Lavrent'ev av., 3, Novosibirsk, 630090, Russia

^c Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Albert-Einstein-Strasse 15, D-12489 Berlin, Germany

*corresponding author, E-mail: yumikh@icct.ru

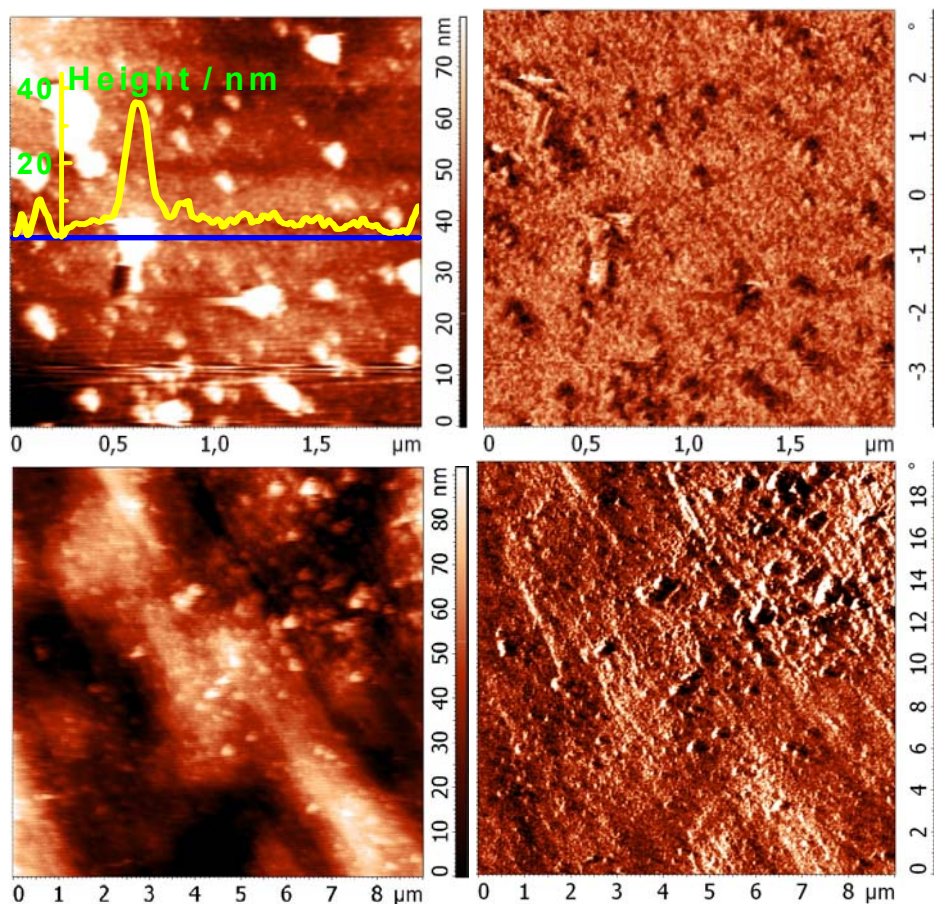


Fig. S1 *In situ* tapping-mode AFM height (left panel) and phase images of the products formed with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3 and condensed on HOPG support acquired in about 15 min (upper panels) and about 2 h after mixing the reactants.

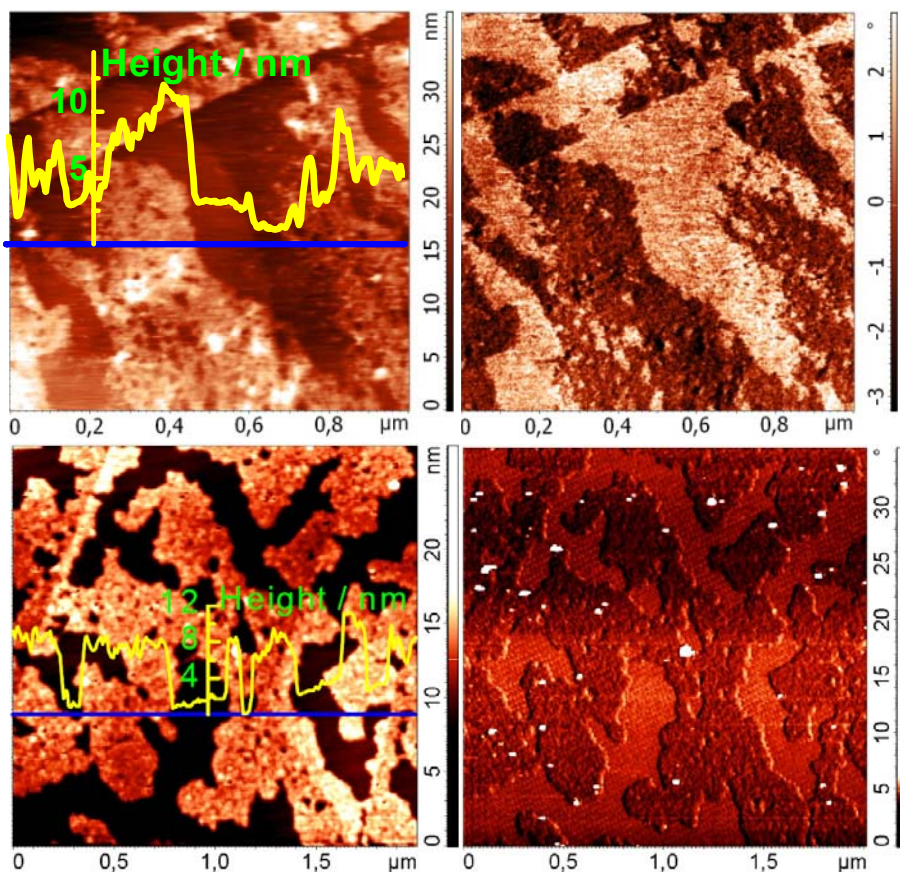


Fig. S2 Tapping-mode AFM height (left) and phase images acquired *in situ* at HOPG areas free from large droplets after 90 min reaction with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3 (upper panels) and *ex situ* from the products dried in air (lower panels).

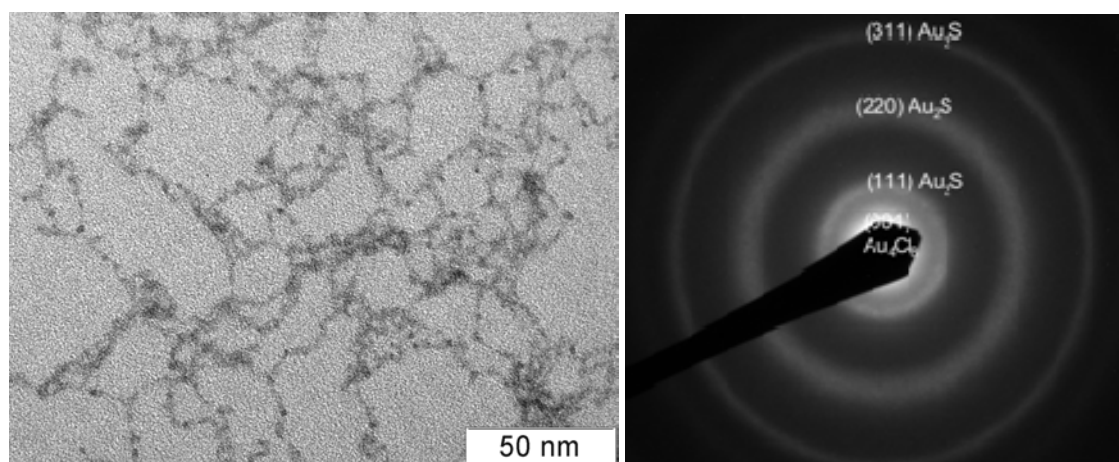


Fig. S3 Typical TEM image and electron diffraction pattern of the products afforded with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3.

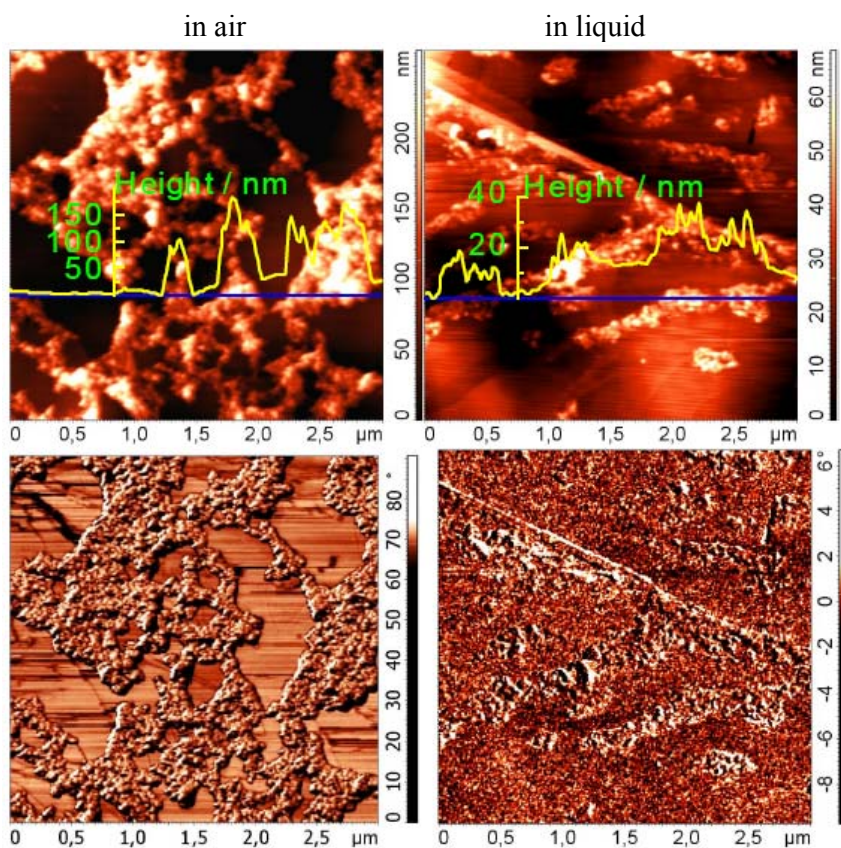


Fig. S4 *Ex situ* (left) and *in situ* (right panels) tapping-mode AFM height and phase (lower panels) images of the products formed with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 1.8 on HOPG support.

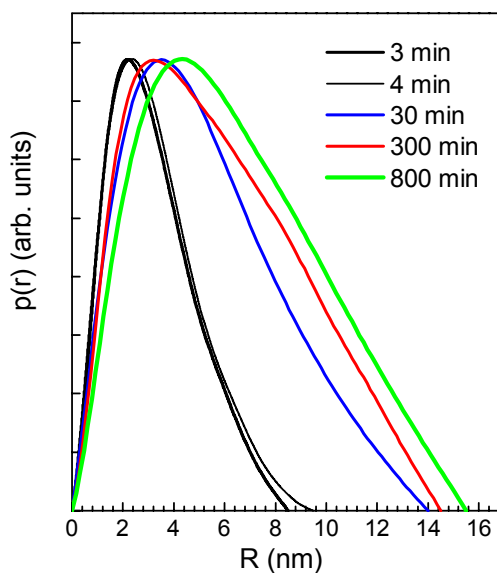


Fig. S5 Distance distribution functions determined from SAXS data for solutions with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3 for various reaction times.

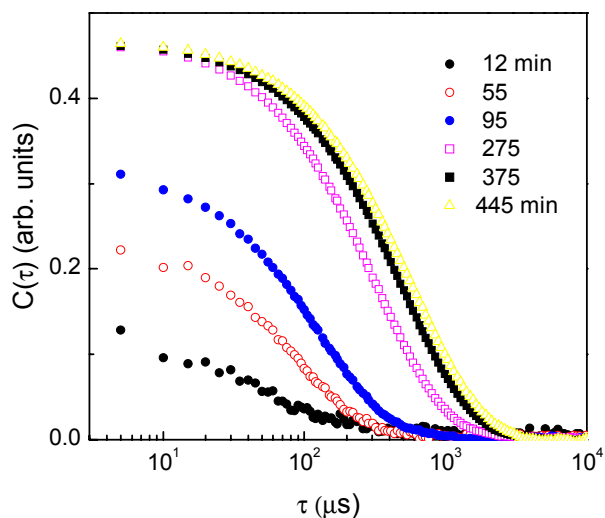


Fig. S6 Typical autocorrelation functions of dynamic light scattering measured in the medium with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3 at different reaction times.

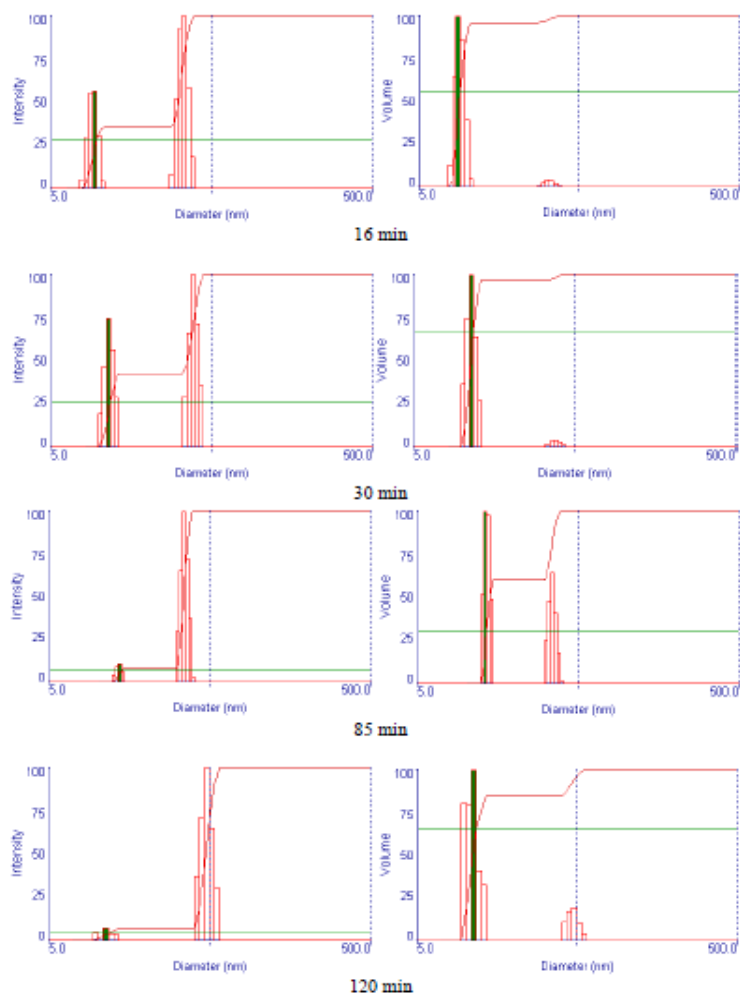


Fig. S7 Particle size and relative volume distribution derived from dynamic light scattering measured in the medium with $\text{Na}_2\text{S}/\text{AuCl}_4^-$ ratio of 3 at selected reaction times.