Electronic Supplementary Material (ESI) for RSC Advances

Gold nanoparticles confined in lamellar mesophases

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Supplementary Information

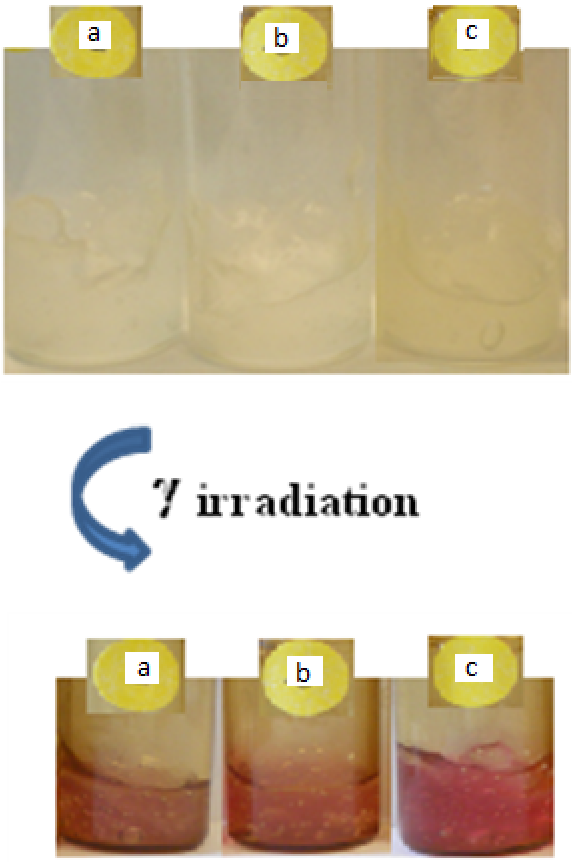

Fig. S1 : Pictures of the vials containing the lamellar mesophases (before and after irradiation) of increasing water layer thicknesses (a) d_w = 1.3 nm, (b) d_w = 5.9 nm and (c) d_w = 14.3 nm (the samples correspond to the conditions of figure 1).

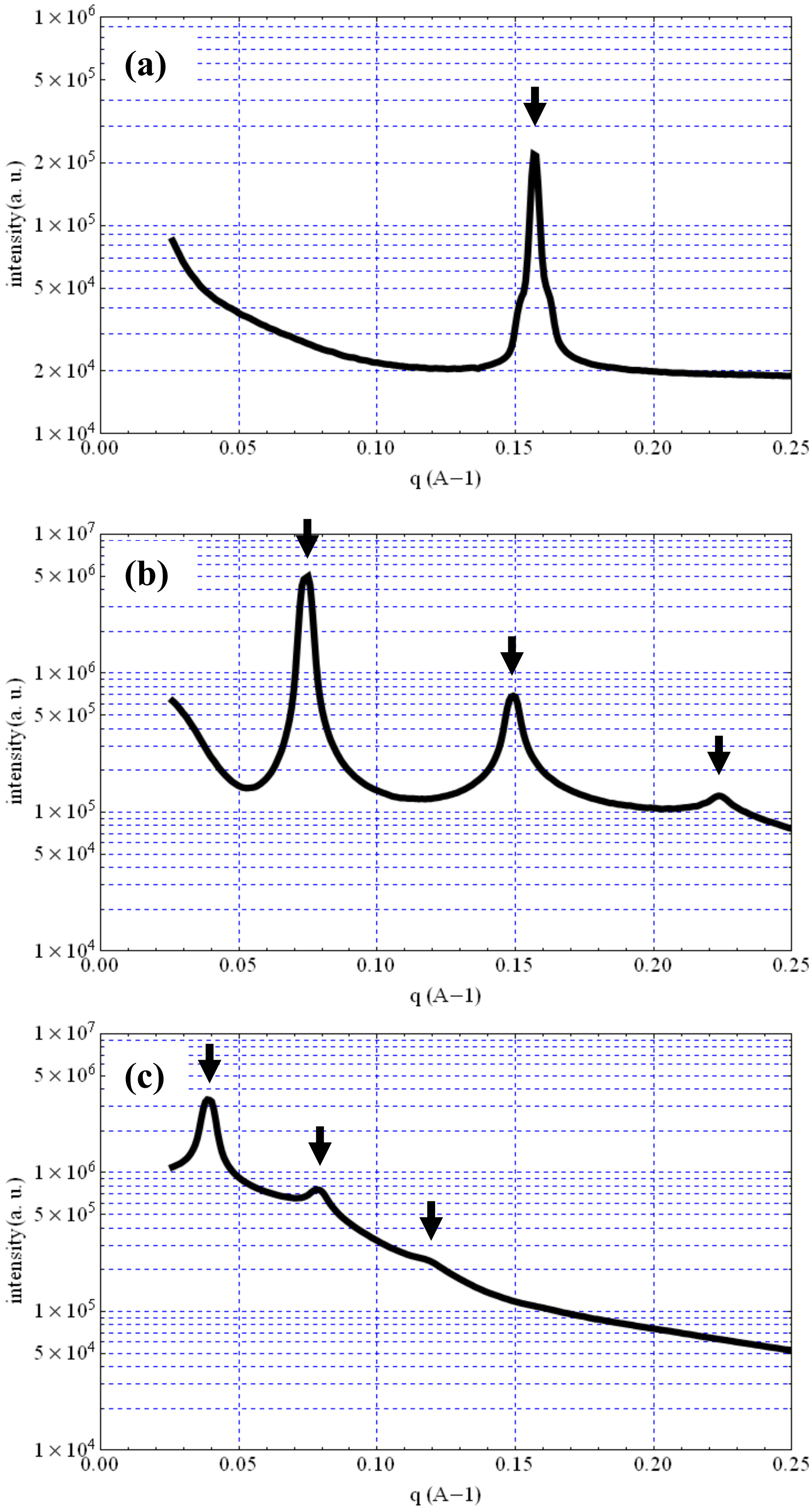

Fig S2. SAXS spectra of lamellar phases after irradiation with increasing water layer thicknesses (a) d_w = 1.3 nm, (b) d_w = 5.9 nm and (c) d_w = 14.3 nm (corresponding to figure 1).

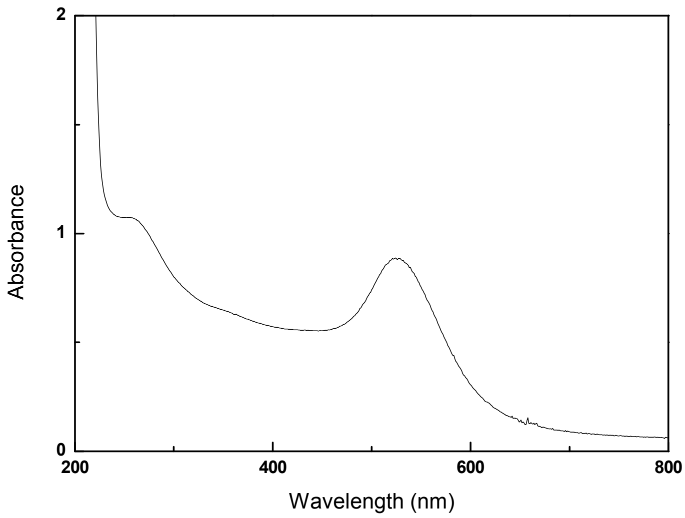

Fig S3. UV-Visible absorption spectrum of gold nanoparticles induced by radiolysis in lamellar mesophase, water thickness (d_w) equals to 15 nm. The corresponding nanoparticles observed by TEM are spherical and have a mean diameter of 8.5 nm.

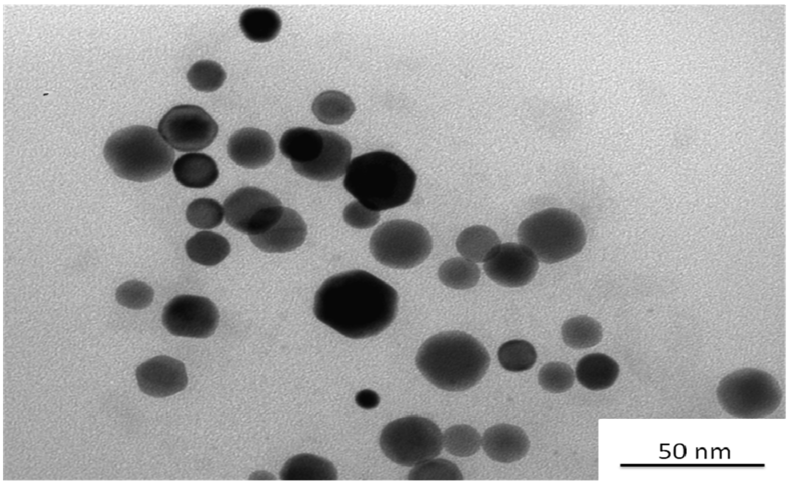

Fig S4. TEM pictures of the gold nanoparticles obtained by irradiation (dose of 20 kGy) of a dilute micellar solution containing $HAuCl_4$ (10^{-3} M), hexanol (0.19 M) and CTAB (0.082 M). The dose necessary to reduce all the gold complexes in micellar solutions is lower (20 kGy) compared to the dose necessary to reduce the gold complexes at the same concentration in lamellar phases (46 kGy). Indeed, the lamellar phases contain larger concentrations of CTAB, and then larger amounts of oxidative radicals $Br_2^{\bullet -}$ and Br_3^- are formed under radiolytic conditions in this case.

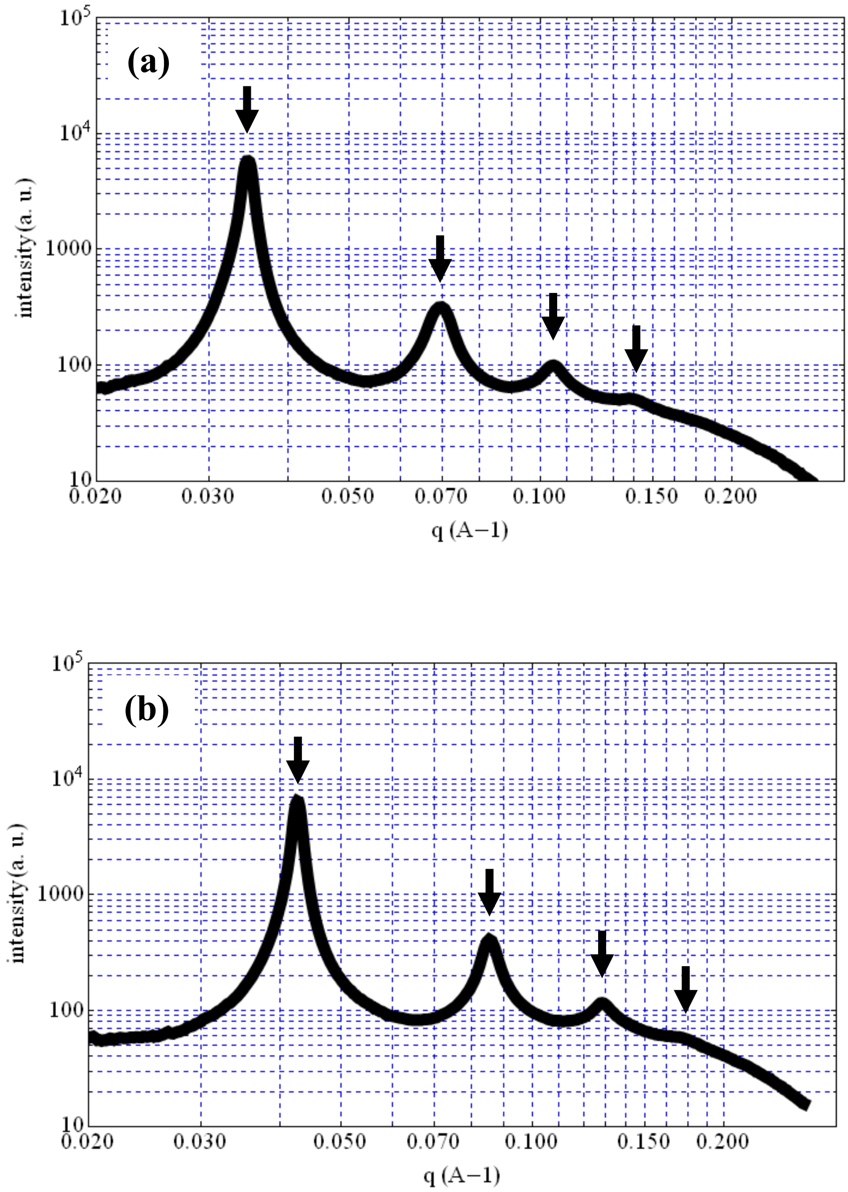

Fig S5. Comparison of the SAXS spectra of two lamellar phases. (a) the reference lamellar phase in pure water of composition : 9% CTAB/6% hexanol/85 % water (w/w) (b) the lamellar phase prior to radiolysis used for the direct gold nanorods synthesis of composition : 11.2 % CTAB/5.8 % hexanol/82.9 % synthesis solution (w/w).