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Electronic Supplementary Information (ESI)

Colloidal gold nanoparticle formation derived from self-assembled supramolecular structure of cyclodextrin/Au salt complex

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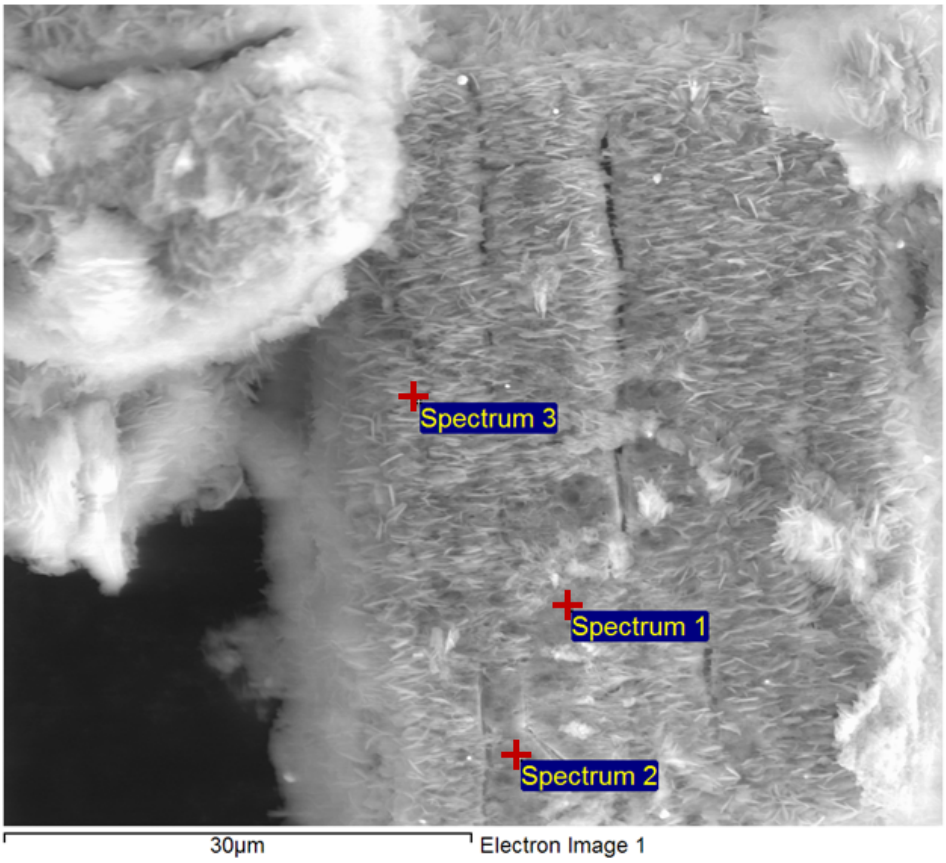

Processing option : All elements analysed (Normalised)

Spectrum	In stats.	C	O	Cl	Au	Total
Spectrum 1	Yes	72.65	24.31	0.31	2.73	100.00
Spectrum 2	Yes	72.88	23.30	0.29	3.53	100.00
Spectrum 3	Yes	69.10	23.22	0.62	7.07	100.00

Fig. S1. Morphological image of *SCA* obtained by FE-SEM equipped with EDXS. Relatively more concentrated Au atoms are detected at the spectrum 3 that is the region with the hexagonally flat-flaky morphology in *SCA*.

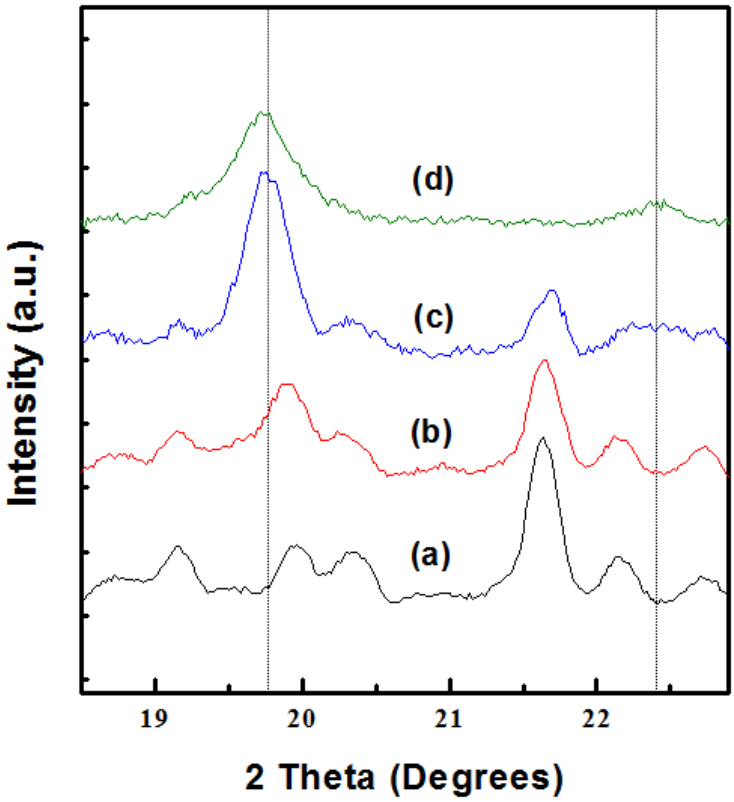

Fig. S2. WXRD patterns of (a) *unmodified α-CD*, (b) THF-treated *α-CD*, (c) *SCA* and (d) *T-SCA* in the 2θ range of 18.5° to 23.5°. In typical, it is well known that when *α-CDs* have channel-type crystalline, the characteristic peaks of channel structure appear at 2θ = 19.6° (210) and 22.4° (300). As shown in Fig. S2, the peaks at 2θ = 19.6° and 22.4° corresponding to the channel structure were newly developed for *SCA*, while the characteristic peak (2θ = 21.6°) of the cage structure originated from *α-CD* was considerably reduced in *SCA*. Meanwhile, the peak corresponding to the cage structure disappeared in *T-SCA*, while the characteristic peaks for the channel structure were still present. Moreover, the peaks broadened totally. The results suggested that Au salt molecules were positioned in between the cage-type structure and the flaky plate-like layer, and the cage-type crystalline structure was disrupted by the growth of Au seeds.

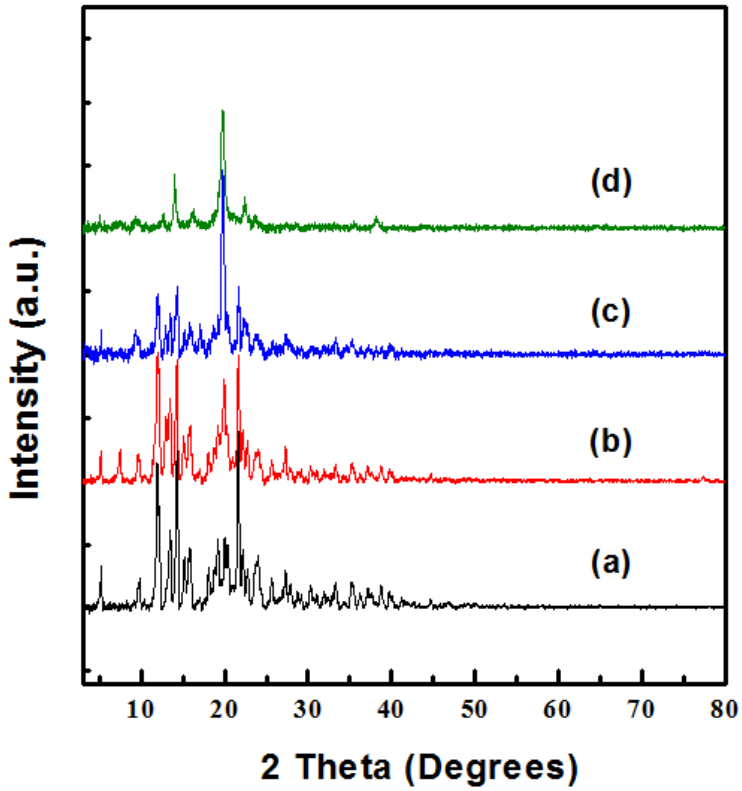

Fig. S3. WXRD of (a) *unmodified α-CD*, (b) THF-treated *α-CD*, (c) *SCA* and (d) *T-SCA* in the 2θ range of 3° to 80°. In this Fig. 3, we cannot observe the typical diffraction peaks of gold metal with face centred cubic phase in *T-SCA*.

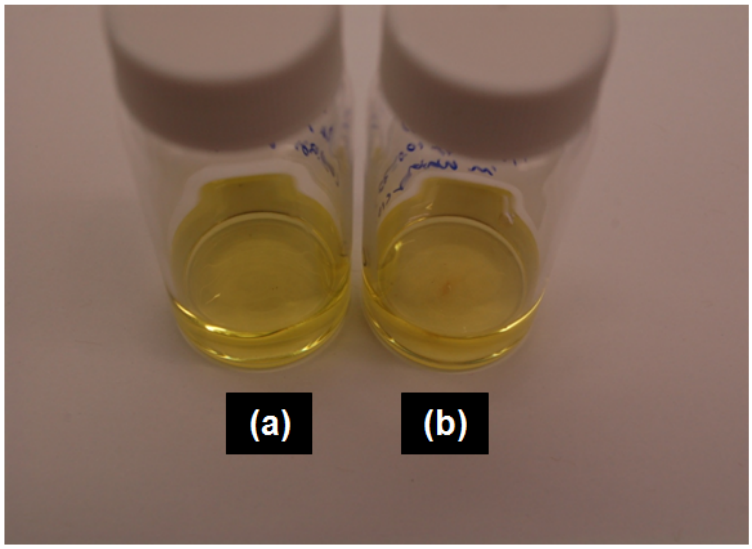

Fig. S4. Images of (a) Au salt aqueous solution and (b) simple mixing of *α-CD* and Au salt in water over 2 weeks after solution preparation. Both solutions remained in a clean yellowish solution. Moreover, we could observe brownish precipitates in the *α-CD*/Au salt aqueous solution indicative of bulk gold formation instead of gold nanoparticles.

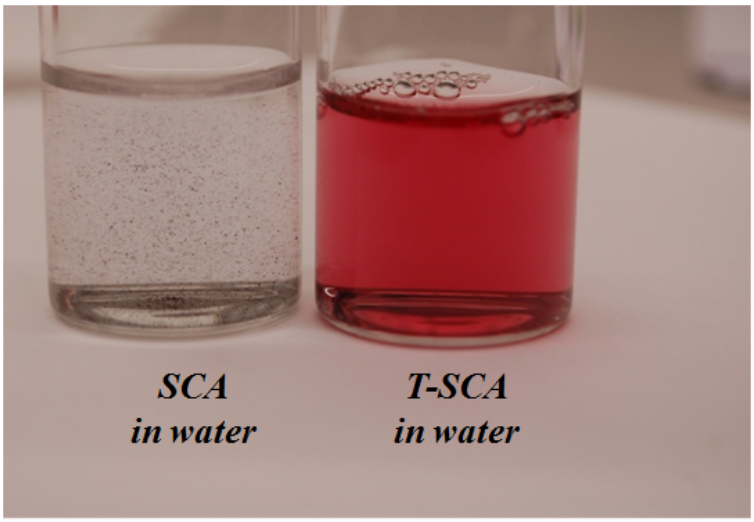

Fig. S5. Photo images of *SCA* and *T-SCA* in aqueous medium at 1 week after the solutions preparation.