Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary information

Au nanocrystal superlattices: nanocrystallinity, vicinal surfaces, and growth processes

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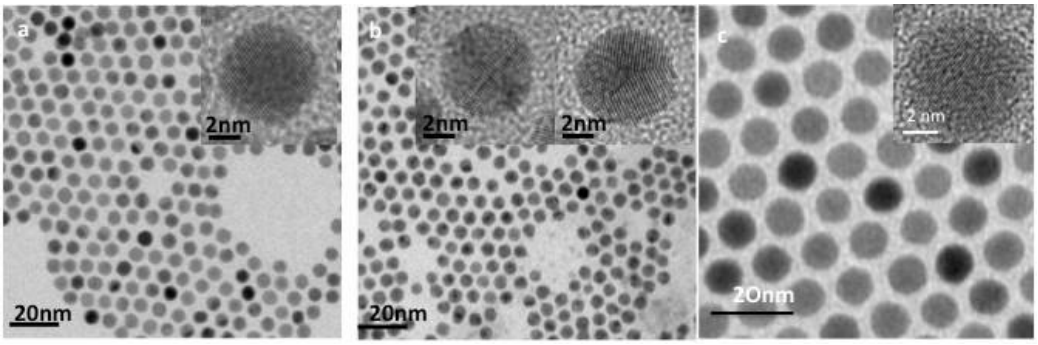

Figure S1: TEM images of Au_{single} (a) Au_{poly} (b) and Co(ε) (c) NCS. Insets corresponding HRTEM images

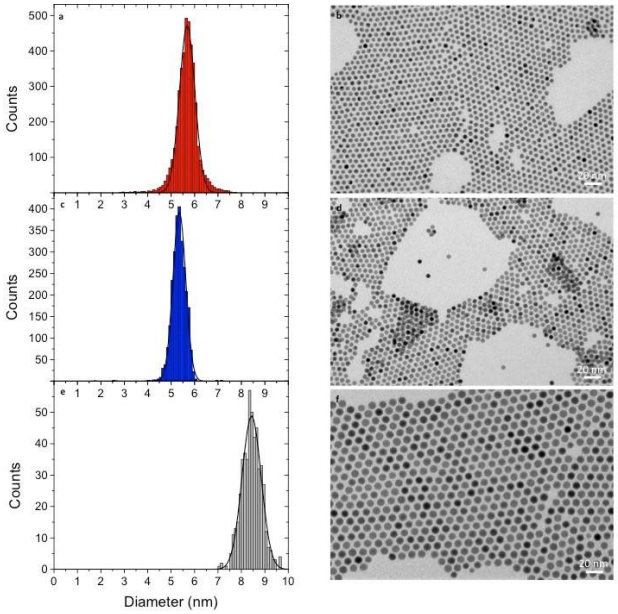

Figure S2. Au_{poly} (red), Au_{single} (blue) and Co(ε) (grey) nanoparticle size distributions (a) and their corresponding TEM pictures (b).

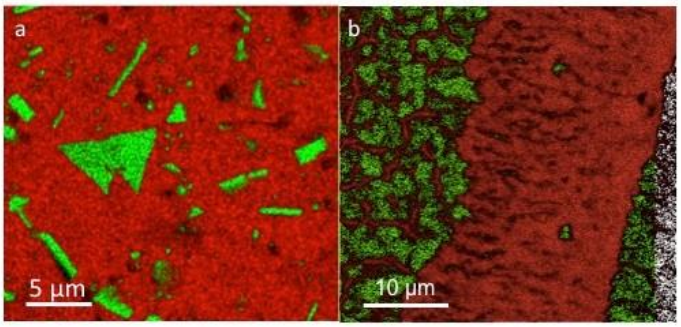

Figure S3. Elemental maps corresponding to $L_{\alpha 1}$ of Au(green) and $K_{\alpha 1}$ of Co (ε) NCs (red). (a) Self-assembly of Au_{single} and Co(ε) NCs. Note the phase separation of Au_{single} and Co supracrystals with well defined Au shape supracrystals. (b) Self-assembly of Au_{poly} and Co(ε) NCs. Note that Au_{poly} and Co(ε) NCs form smaller grains superlattices.

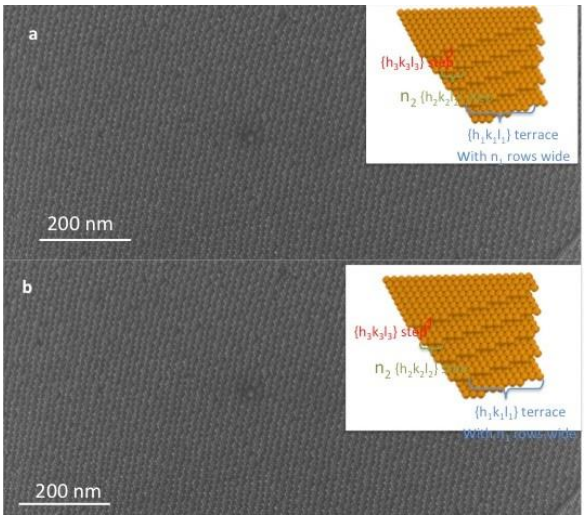

Figure S4. Various vicinal surfaces of Au_{single} supracrystals in presence of Co(ε).

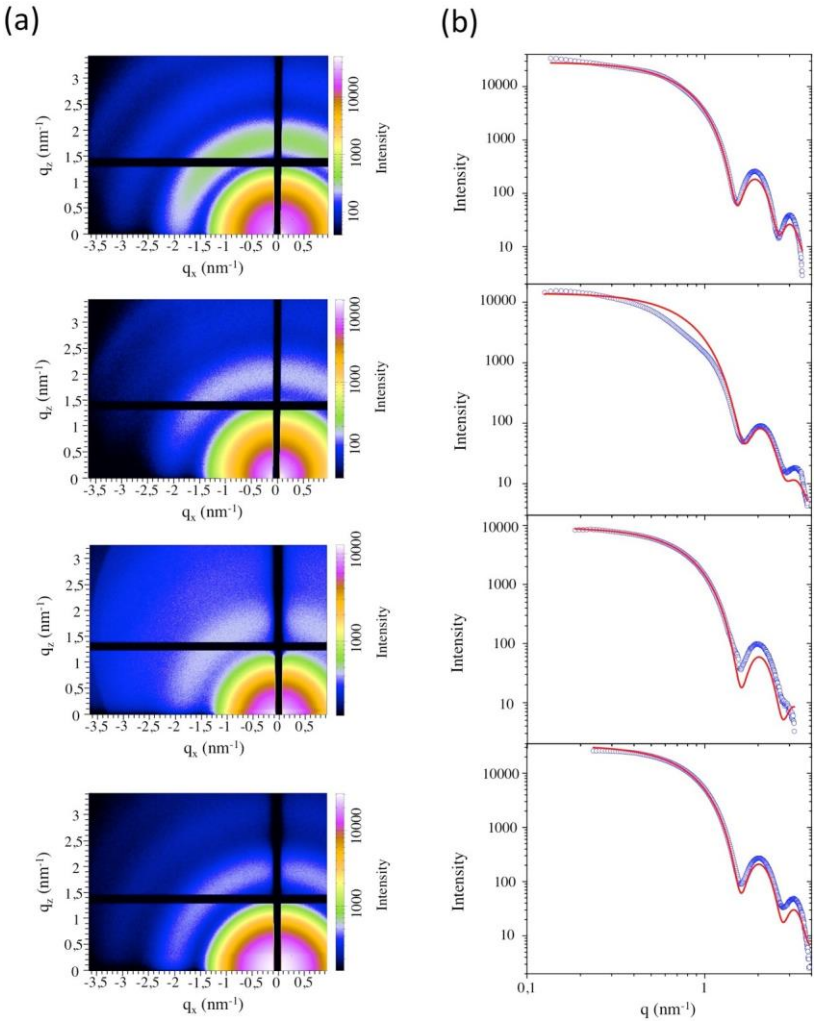

Figure S6. GISAXS patterns (a) and their corresponding radially integrated intensity profiles (b) of the initial colloidal solution drop for Au_{single}/ Co(ε), Au_{poly}/ Co(ε), Au_{single} and Au_{poly} , from the top to bottom.

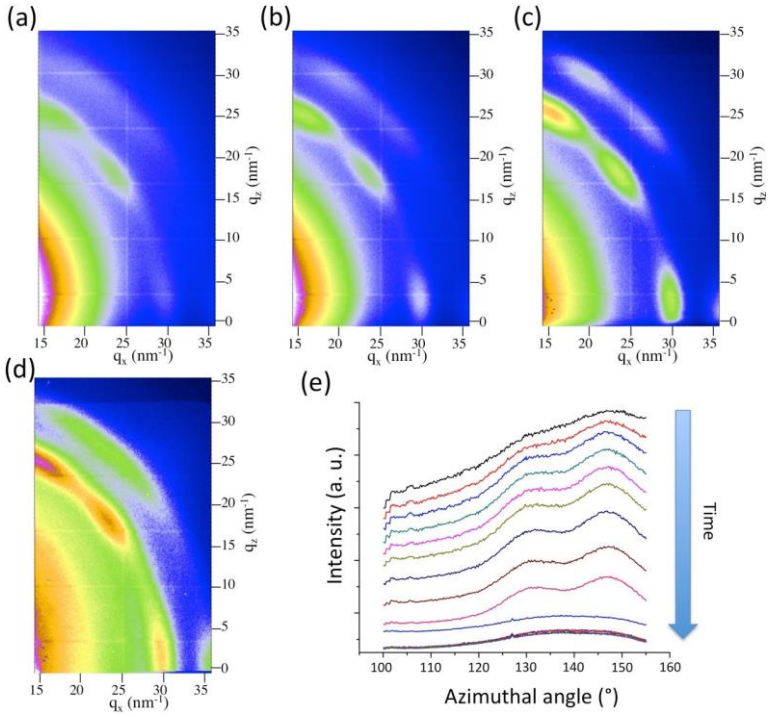

Figure S7. Evolution of GIWAXS patterns of Au_{single} NCs at 20s (a), 50s (b), 100s (c) and 140s (d). Evolution of corresponding WAXS profiles (e).

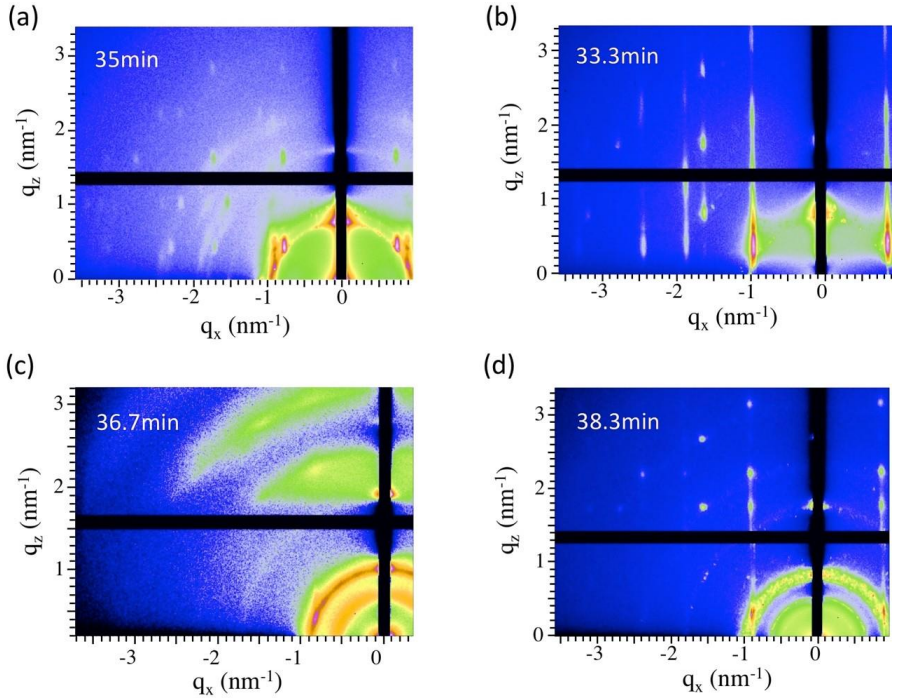

Figure S8 GISAXS patterns after final evaporation of Au_{single} (a), Au_{poly} (b), Au_{single}/ Co(ε) (c) and Au_{poly}/ Co(ε) (d).

	Toluene atmosphere			Hexane atmosphere
	Without Co		With Co	With Co
Au_{single}	$a_{compressed\_fcc}$ =12.3nm $c_{compressed\_fcc}$ =11.2nm	d_{pp}=3.3nm	a_{fcc}=12.3nm	a_{fcc}=12.4nm
			d_{pp} =3.3nm	d_{pp} =3.4nm
Au_{poly}	a_{hcp}=8.2nm c_{hcp}=13.5nm	d_{pp}=2.6nm	a_{hcp}=8.2nm c_{hcp}=13.4 nm	a_{hcp}=8.2nm c_{hcp}=13.2 nm
			d_{pp}=2.6nm	d_{pp} =2.5nm

Table S1. Au SC parameters differing by their nanocrystallinity, single domain (Au_{single}) and polycrystals (Au_{poly}), deduced from GISAXS patterns in the various experimental conditions. Let admit an error of 0.1nm no influence of Co(ε) NCs.

Sample	D_{SAXS}	σ_{SAXS}	D_{TEM}	σ_{TEM}
Au_{single}	5.54	0.40	5.4	0.4
Au_{poly}	5.56	0.40	5.6	0.4
Au_{single} + Co	5.84	0.44		
Au_{poly} + Co	5.30	0.54		

Table S2. NC diameter determined by SAXS (D_{SAXS}) and TEM (D_{TEM}) with their corresponding standard deviation (σ).