## Controllable synthesis of Au nanocrystals with Systematic Shape

## **Evolution from Octahedron to Truncated Ditetragonal Prism and**

## **Rhombic Dodecahedron**

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Fig. S1 Gold NCs synthesized without Ag<sup>+</sup>.



Fig. S2 Gold NCs synthesized under the action of 20  $\mu$ L 25 mM AgOCOCH<sub>3</sub>.



Fig. S3 Gold NCs synthesized under the action of 40  $\mu L$  25 mM AgOCOCH3.



Fig. S4 Gold NCs synthesized under the action of 60  $\mu L$  25 mM AgOCOCH\_3.



Fig. S5 Gold NCs synthesized under the action of 80  $\mu L$  25 mM AgOCOCH\_3.



Fig. S6 Gold NCs synthesized under the action of 100  $\mu L$  25 mM AgOCOCH\_3.



Fig. S7 gold NCs synthesis in the absence of PDDA.



Fig. S8 Gold NCs synthesis in 200  $\mu\text{L}$  PDDA.



Fig. S9 Gold NCs synthesis in 400 µL PDDA.



Fig. S10 Gold NCs synthesis in 440  $\mu L$  PDDA.



Fig. S11 Gold NCs synthesis in 480  $\mu\text{L}$  PDDA.



Fig. S12 Gold NCs synthesis in 520  $\mu\text{L}$  PDDA.



Fig. S13 Gold NCs synthesized under the action of 60  $\mu$ L 25 mM AgNO<sub>3</sub>.