Electronic Supplementary Material (ESI) for CrystEngComm

Supplementary Information

Shape-controlled synthesis of PbS nanostructures from -20 to 240 °C: the competitive process between growth kinetics and thermodynamics

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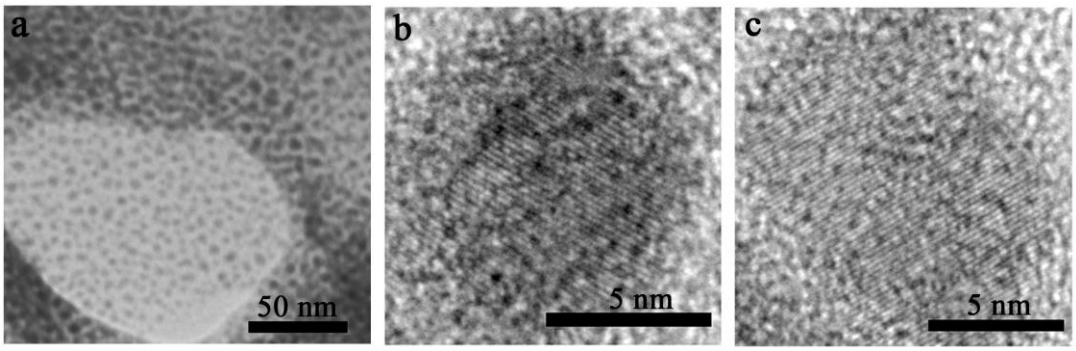

Fig. S1 TEM (a) and HRTEM (b, c) images of PbS NCs synthesized at -20 °C with OLA and OA included.

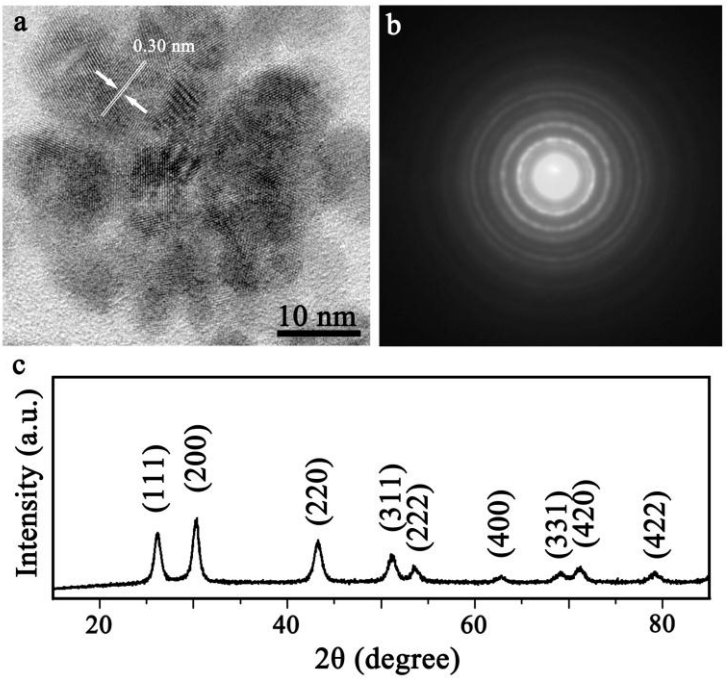

Fig. S2 PbS nanoflowers synthesized at room temperature with OLA and OA included. (a) HRTEM image, (b) SAED pattern, and (c) XRD pattern of PbS nanoflowers.

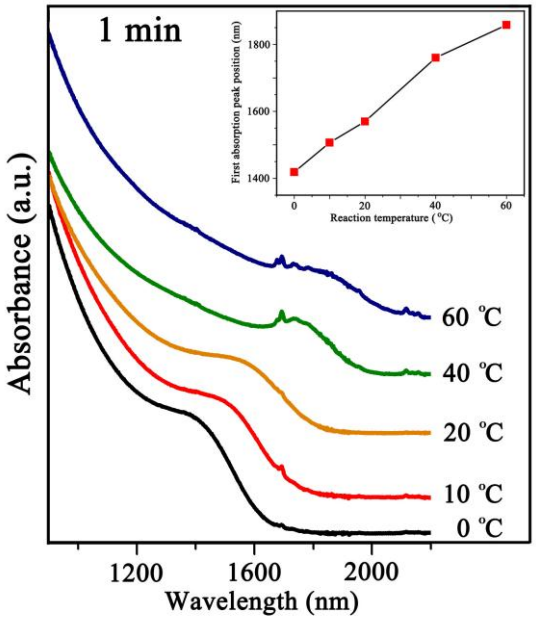

Fig. S3 Near-infrared absorption spectra of PbS nanoparticles synthesized at different temperature. These PbS nanoparticles were synthesized with OLA included, and all these reactions were kept for 1 min. Inset in Fig. S3 is corresponding reaction temperature versus the position of the first absorption peak.

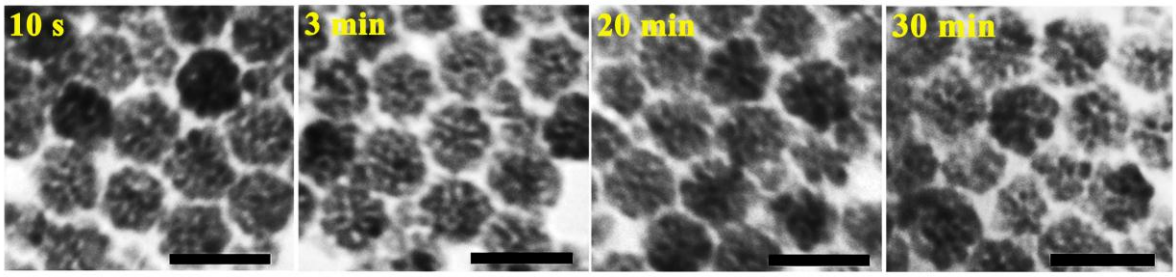

Fig. S4 Temporal evolution of TEM images of the PbS nanoflowers synthesized at 25 °C with OA and OLA included. All scale bars represent 50 nm.

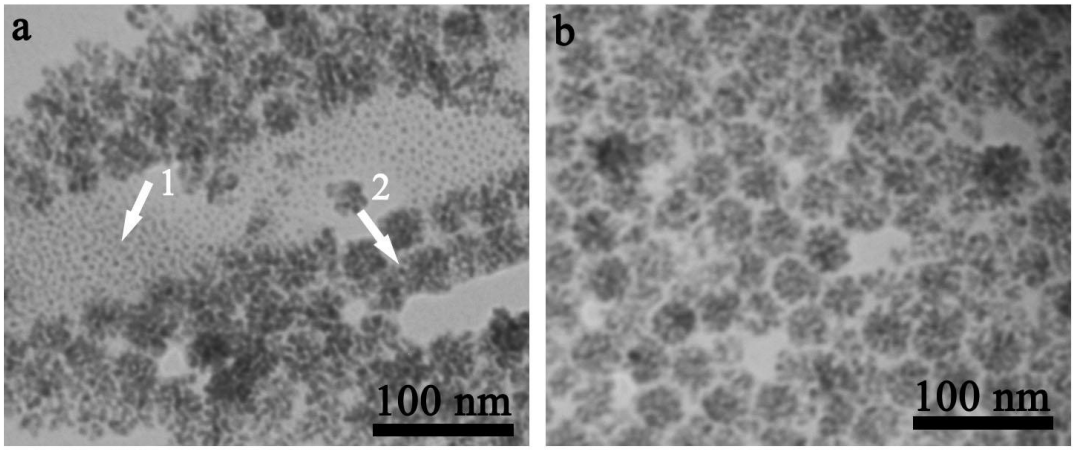

Fig. S5 PbS nanoflowers synthesized at -10 °C (a) and 0 ℃(b) with OLA and OA included. The arrows in panel a show the coexisting nanoparticles (arrow 1) and nanoflowers (arrow 2), respectively, indicating a transformation process from nanoparticles to nanoflowers.

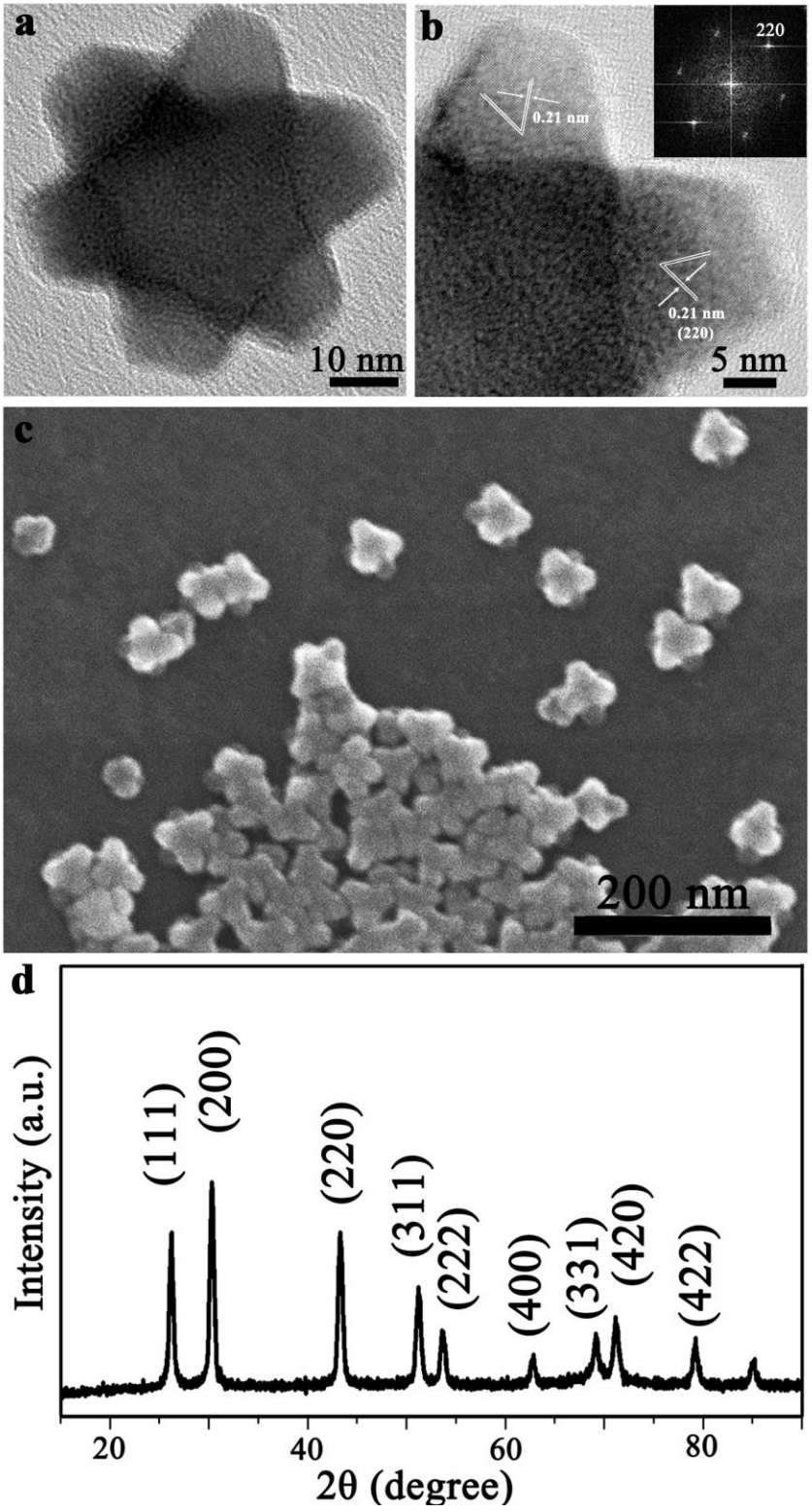

Fig. S6 (a, b) HRTEM images of typical star-shaped PbS NCs synthesized by using individual alkylamine (OLA). (c) SEM image of star-shaped PbS NCs. (d) Corresponding XRD pattern of related PbS nanostars.

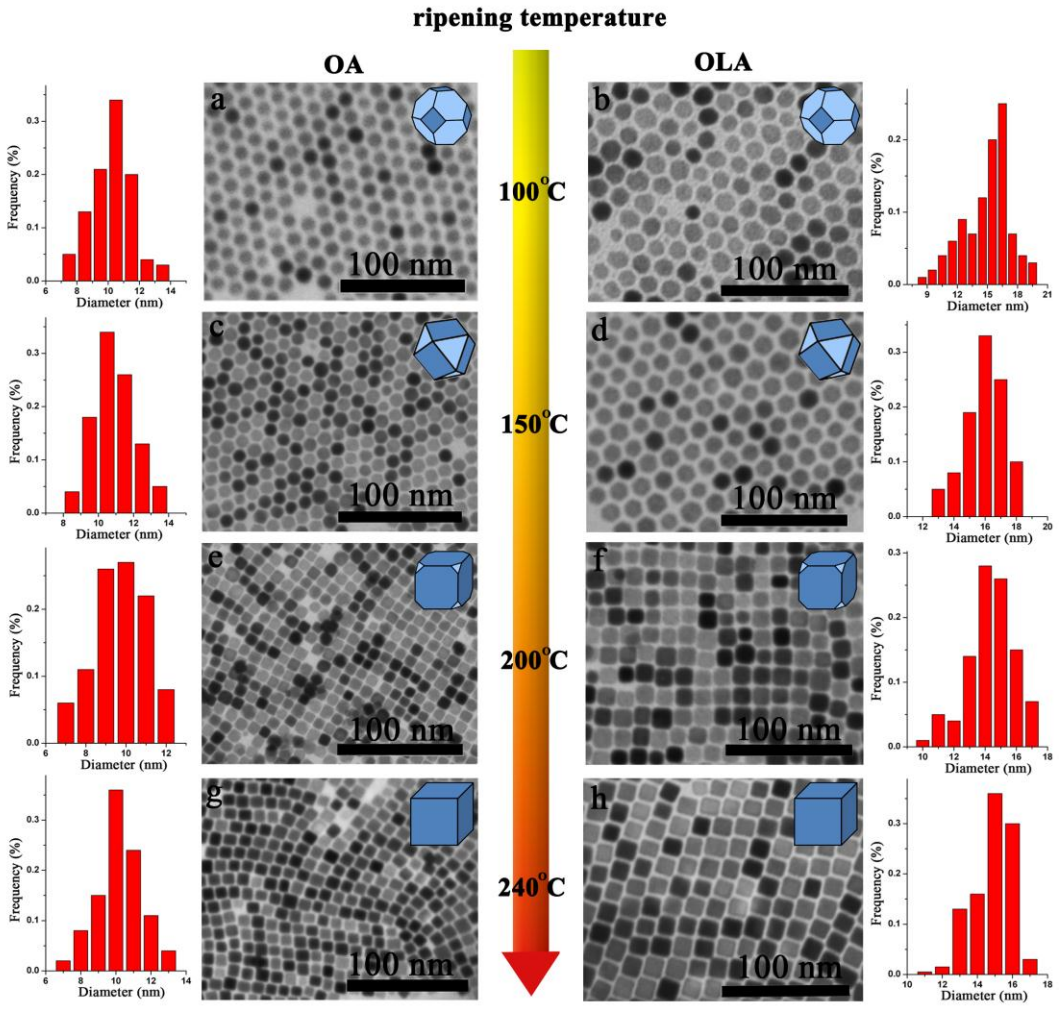

Fig. S7 TEM images of PbS NCs ripened at different temperature by using OA (left column) and OLA (right column). (a, b) 100 °C; (c, d) 150 °C; (e, f) 200 °C; (g, h) 240 °C. (i) Schematic illustration of shape evolution process of PbS NCs depending on temperature.

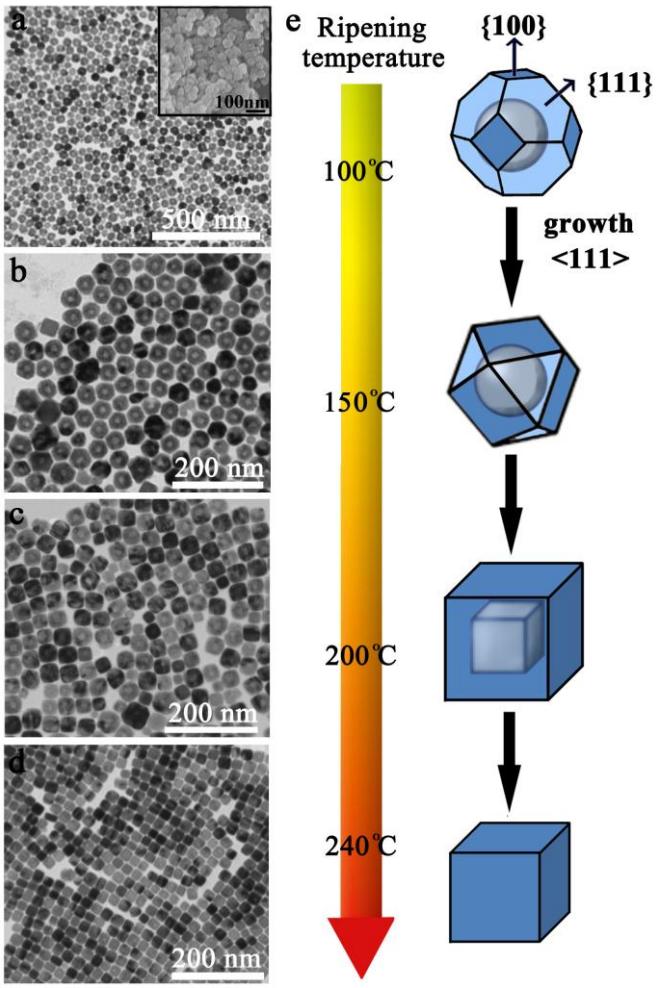

Fig. S8 TEM images of the different-shaped PbS nanostructures evolved from nanoflowers at different ripening temperature. (a) spherical hollow nanostructures obtained at 100 °C, inset in Fig. a is the corresponding SEM image; (b) cuboctahedral hollow nanostructures obtained at 150 °C; (c) cubic–like hollow nanostructures obtained at 200 °C; (d) solid PbS nanocubes obtained at 240 °C. (e) Schematic illustration of shape evolution process of PbS nanoflowers depending on temperature.

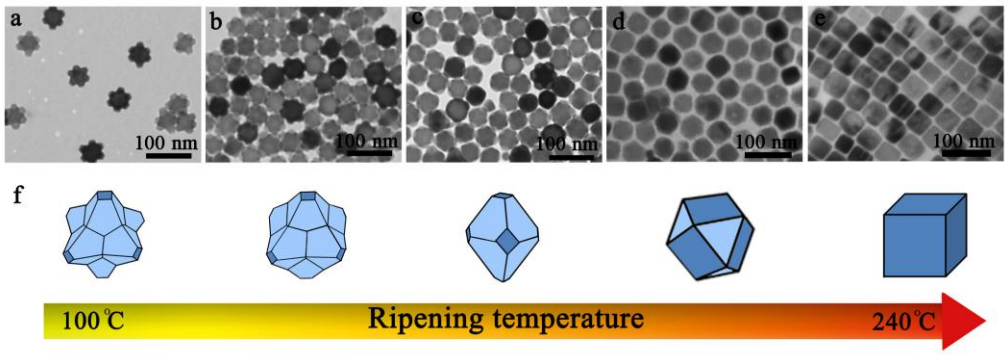

Fig. S9 TEM images of the different-shaped PbS nanostructures evolved from nanostars at different ripening temperature. (a) star-shaped PbS NCs; (b) rounded PbS nanostars; (c) truncated octahedrons; (d) cuboctahedral PbS NCs; (e) cubic-like PbS NCs. (f) Schematic illustration of shape evolution process of PbS nanostars depending on temperature.