

Electronic Supplementary Information (ESI)

Controllable synthesis of γ -AlOOH micro/nanoarchitectures via a one-step solution route

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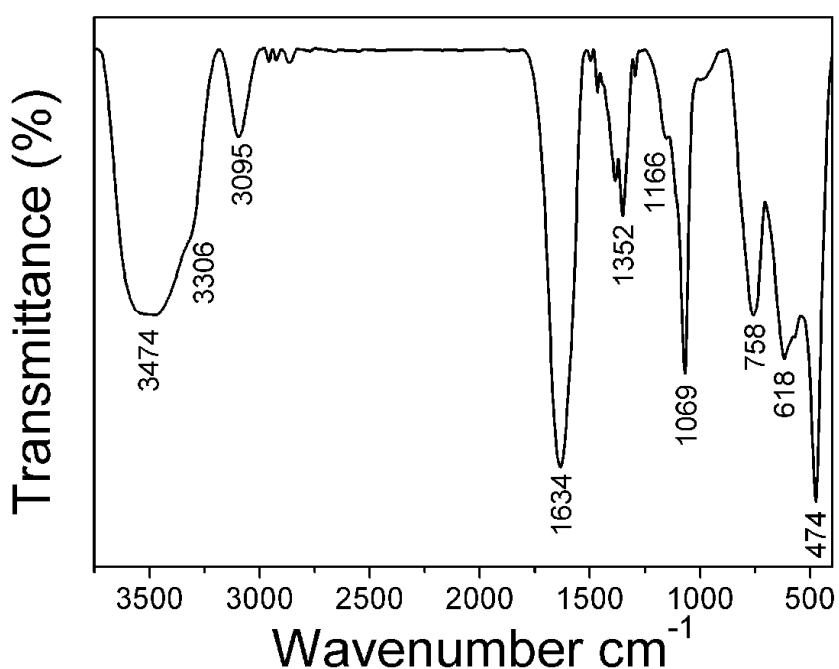


Fig. S1 FT-IR spectrum of the product obtained at 1 h (the content of AlCl_3 : 0.15 mmol, $V_{\text{DMF}}/V_{\text{water}}$: 10/10).

As indicated in Fig. S1, the bands at 3306 and 3095 cm^{-1} belong to the ν_{as} (Al)O-H and ν_{s} (Al)O-H stretching vibrations. The band at 1069 cm^{-1} and the shoulder at 1166 cm^{-1} are assigned to the δ_{s} Al-O-H and δ_{as} Al-O-H modes of AlOOH, respectively. The three strong bands at 758, 618 and 474 cm^{-1} are ascribed to the vibration mode of AlO_6 . In addition, the band at 3474 and 1634 cm^{-1} are the feature of the absorbed water. The above FT-IR analysis indicates that the product obtained at 1 h is AlOOH.

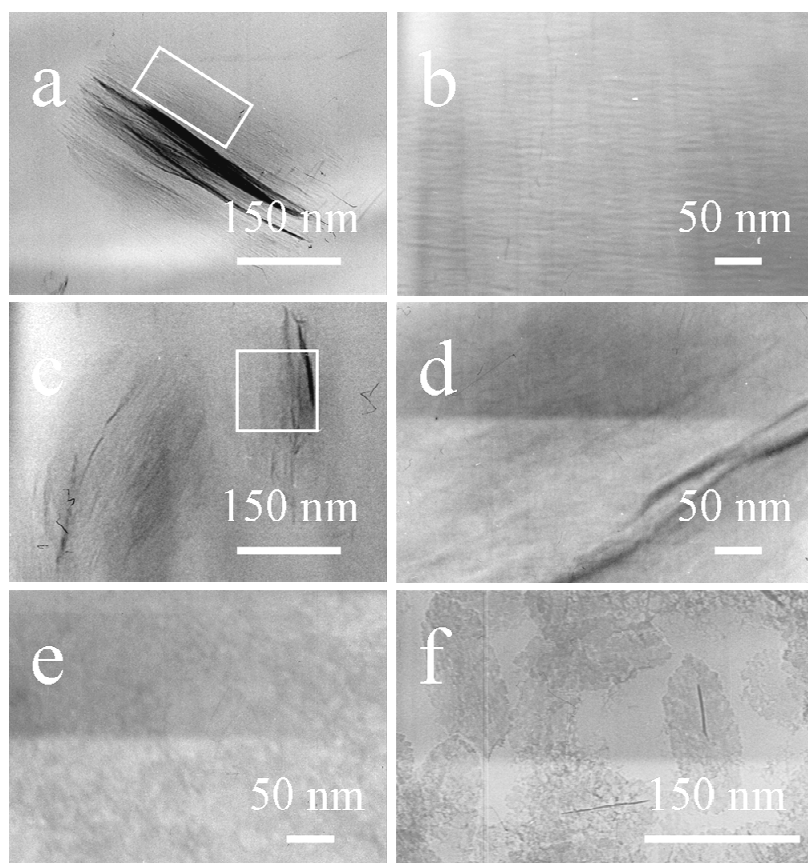


Fig. S2 TEM images of the samples (ellipsoidal flowerlike, rotor-like and leaf-like) obtained at 180 °C for different reaction times: (a, b) ellipsoidal flowerlike, 1.5 h; (c, d) rotor-like, 1.5 h (e) leaf-like, 1 h, and (f) leaf-like, 1.5 h.

From Fig. S2a, it could be seen that the product is underdeveloped ellipsoidal flowerlike structure with diameter of about 400 nm when the reaction time was 1.5 h. A high-magnification TEM image of the edge of the structure (indicated by square in Fig. S2a) is shown in Fig. S2b, indicating that the structure display a loose texture and the self-assembly is still in progress. Fig. S2c and 2d show that the formation of the rotor-like structure is also in progress, which is similar with ellipsoidal flowerlike structure. However, it is difficult to observe the primary nuclei at reaction time of 1 h due to its infinitely size. From Fig. S2e, we can see that the nanoparticles were formed as major product at reaction time of 1 h in the presence of DMF, and the nanoparticles trend to aggregation to form leaf-like structures with extending the reaction time to 1.5 h (Fig. S2f).

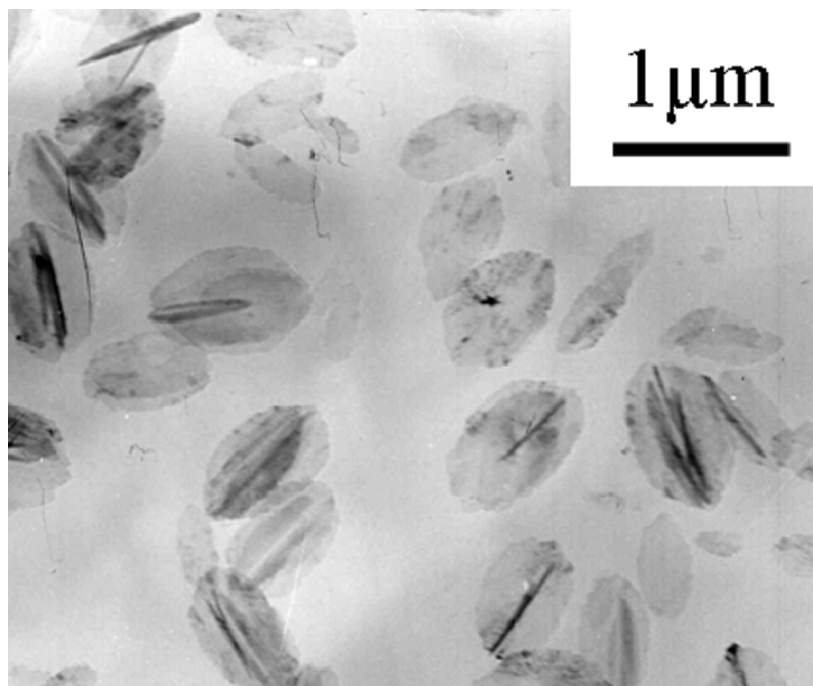


Fig. S3 TEM image of the product obtained at 180 °C for 3 h with the absence of PVP ($V_{\text{DMF}}/V_{\text{water}}$: 10/10, the content of AlCl_3 : 0.15 mmol).