Electronic Supporting Information

Flange Union at Nanoscale: Fabrication and Formation Mechanism

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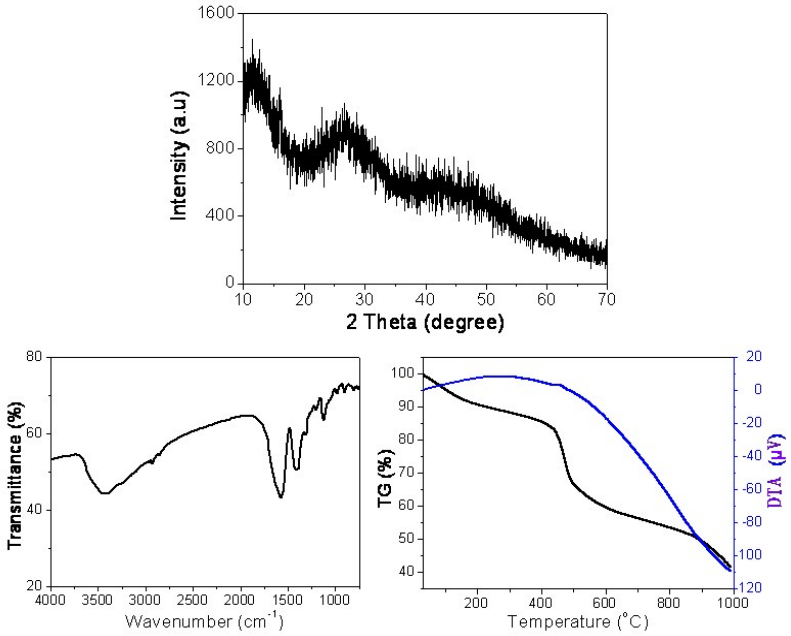

Fig. S1. XRD, IR and TG patterns of the typical products prepared after 5 h.

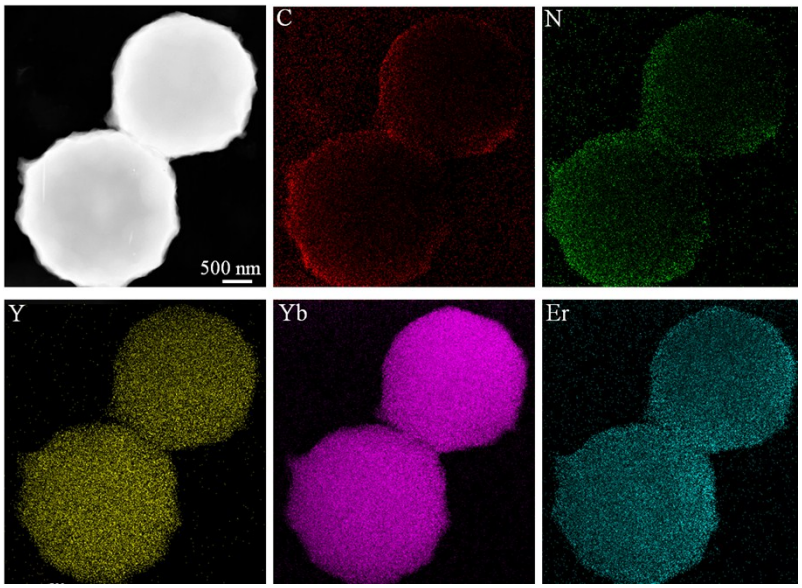

Fig. S2 EDS elemental mapping pattern of the typical product prepared after 5 h.

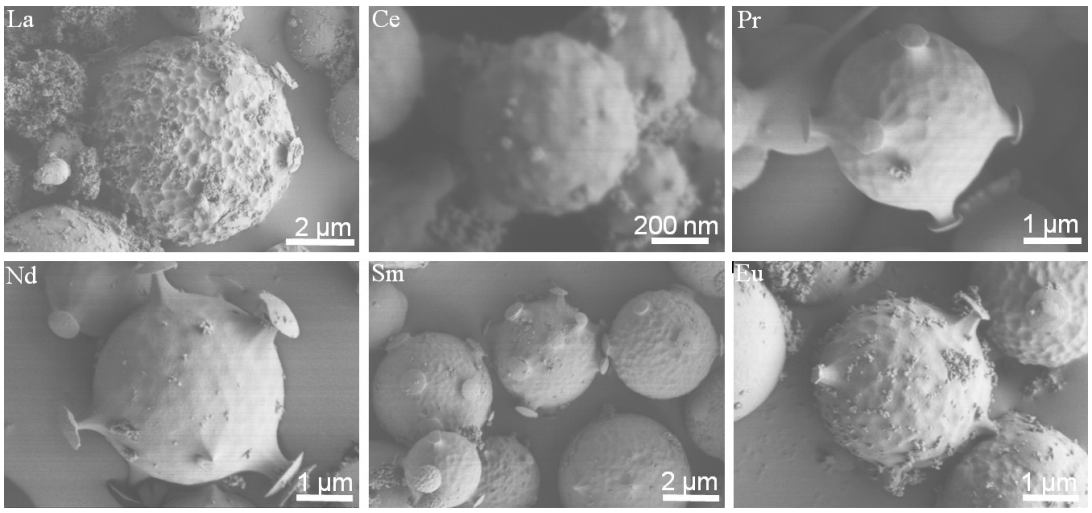

Fig. S3. SEM images of the as-synthesized Ln-L (Yb, Er = 15, 5). (a) La-L; (b) Ce-L; (c) Pr-L; (d) Nd-L; (e) Sm-L; (f) Eu-L. The size of the products are about 2-5 μm.

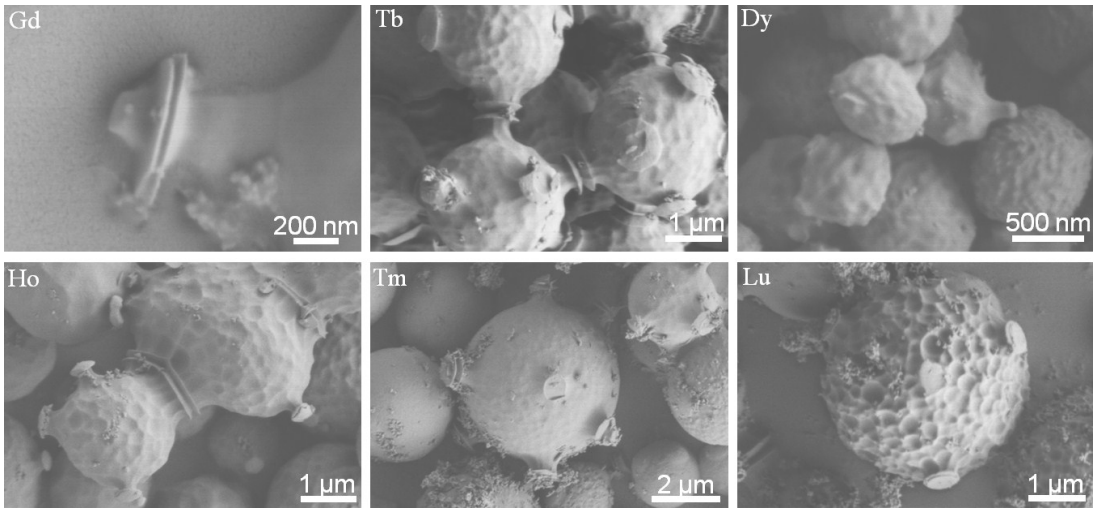

Fig. S4. SEM images of the as-synthesized Ln-L 5h (Yb, Er = 15, 5). (a) Gd-L; (b) Tb-L (c) Dy-L; (d) Ho-L; (e) Tm-L; (f) Lu-L. The size of the products are about 2-5 μm.

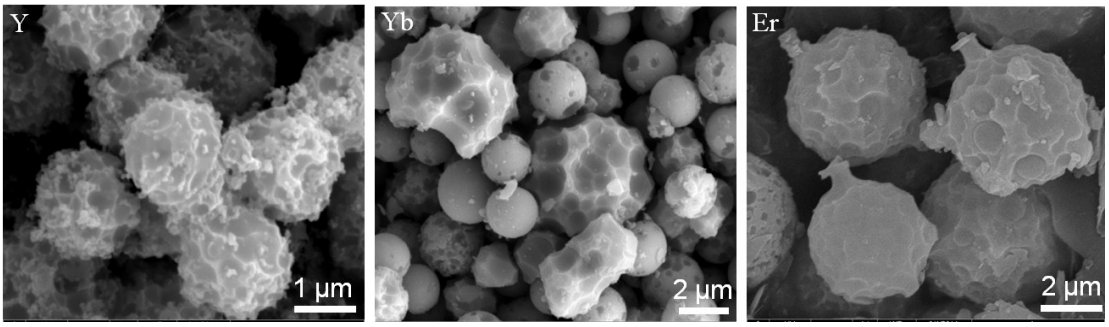

Fig. S5. SEM images of the as-synthesized Ln-L 5h. (a, b) Y-L; (c, d) Yb -L; (e, d) Er -L. The size of the products are about 2-5 μm.

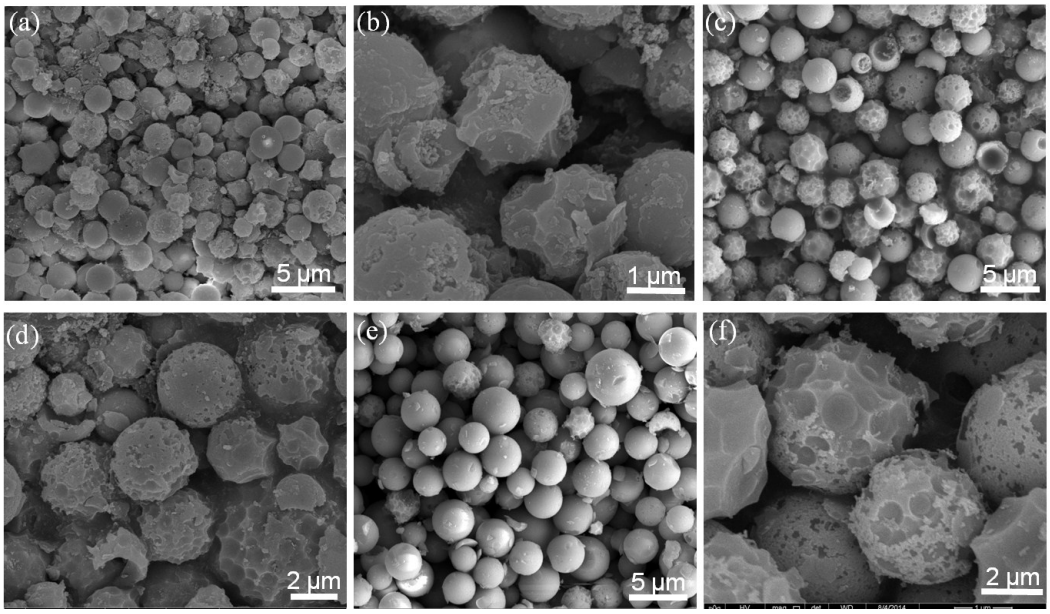

Fig. S6. SEM images of the as-synthesized Y-L 5 h. (a, b) 10% Yb; (c, b) 30% Yb; (e, f) 50% Yb. The size of the products are about 2-5 μm.

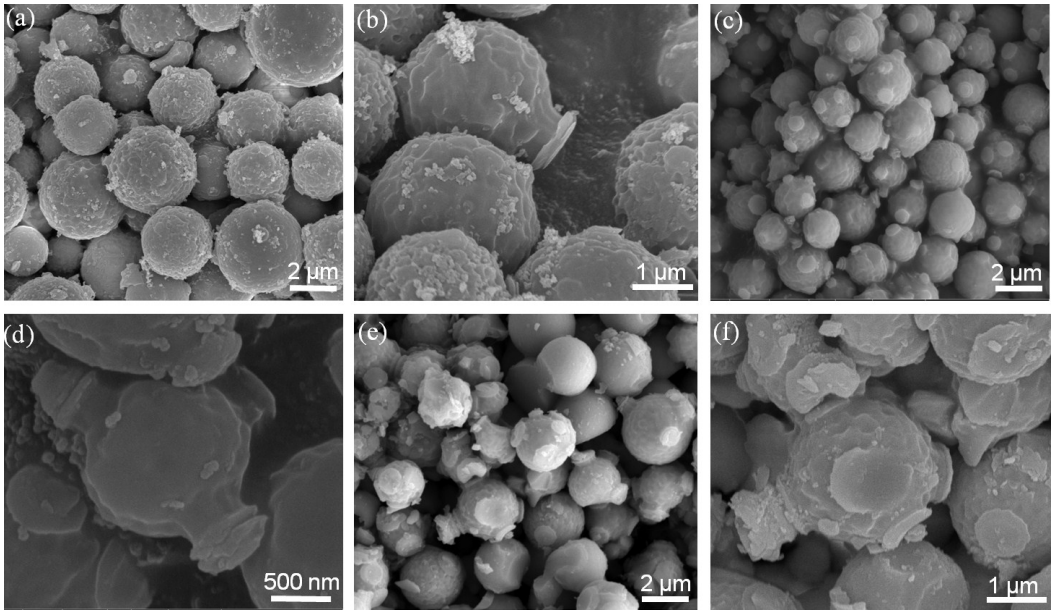

Fig. S7. SEM images of the as-synthesized Y-L 5h. (a, b) 10% Er; (c, b) 30% Er; (e, f) 50% Er. The size of the products are about 2-5 μm.

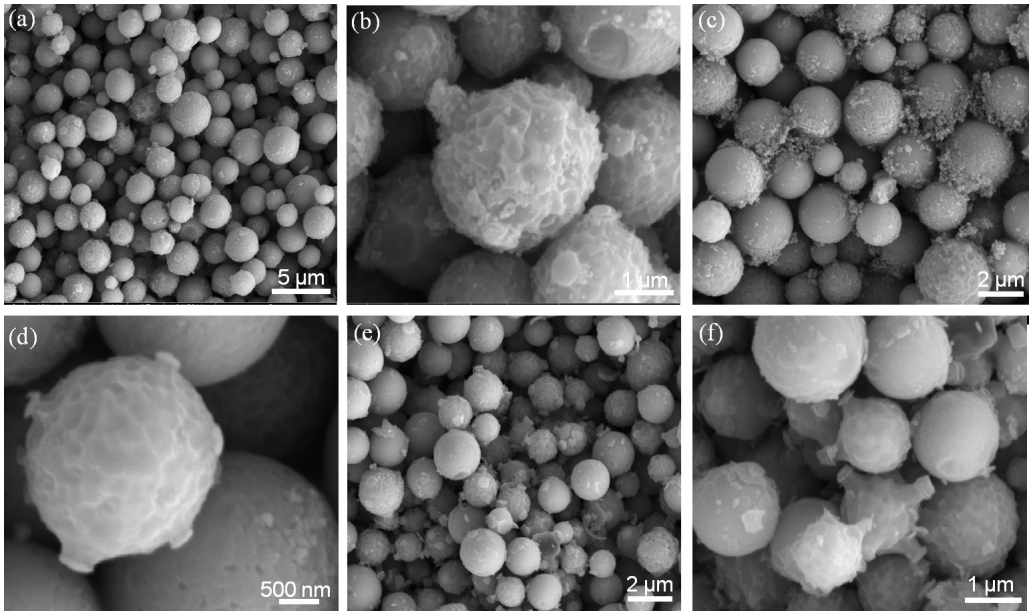

Fig. S8. SEM images of the as-synthesized Y-L 5 h. (a, b) 5%Yb, 15% Er; (c, b) 10%Yb, 10% Er; (e, f) 25%Yb, 25% Er. The size of the products are about 2-5 μm.

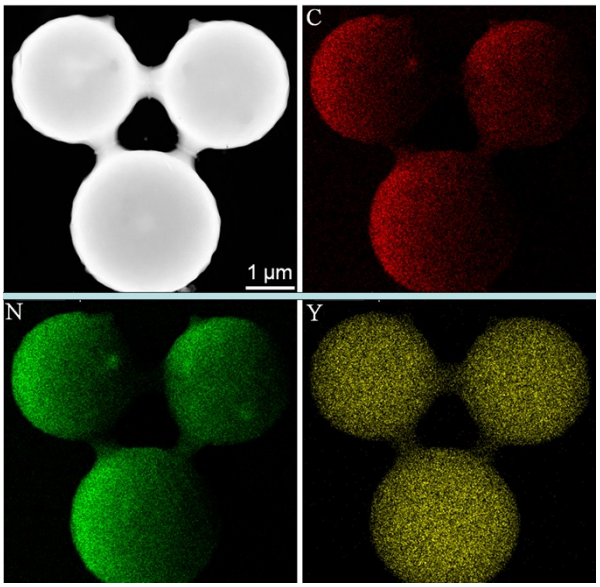

Fig. S9 EDS elemental mapping pattern of product prepared after 2 h.

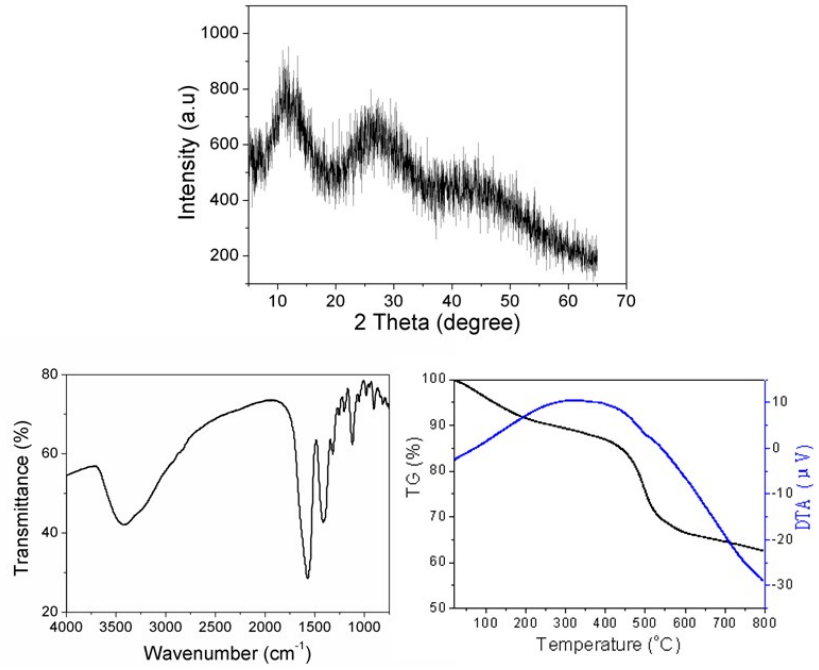

Fig. S10. XRD, IR and TG patterns of the products prepared after 24 h.

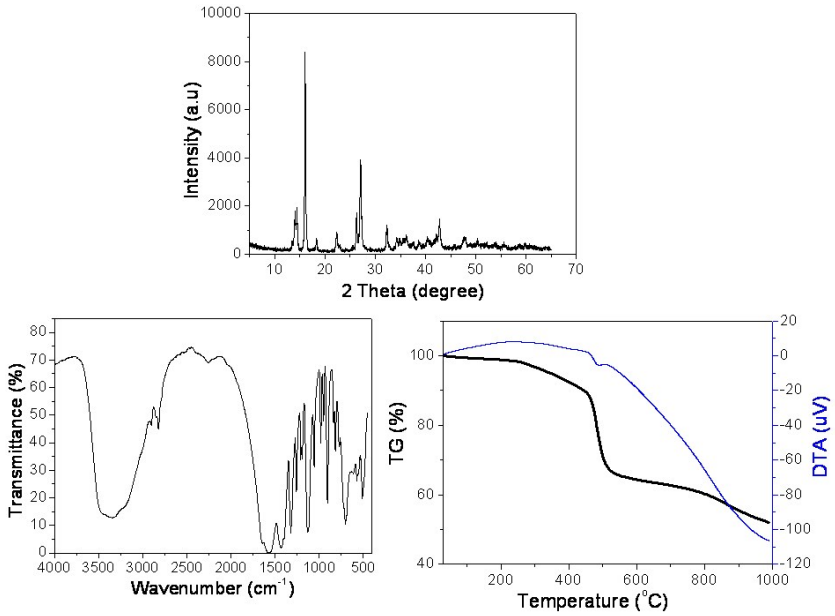

Fig. S11. XRD, IR and TG patterns of the products prepared after 72 h.

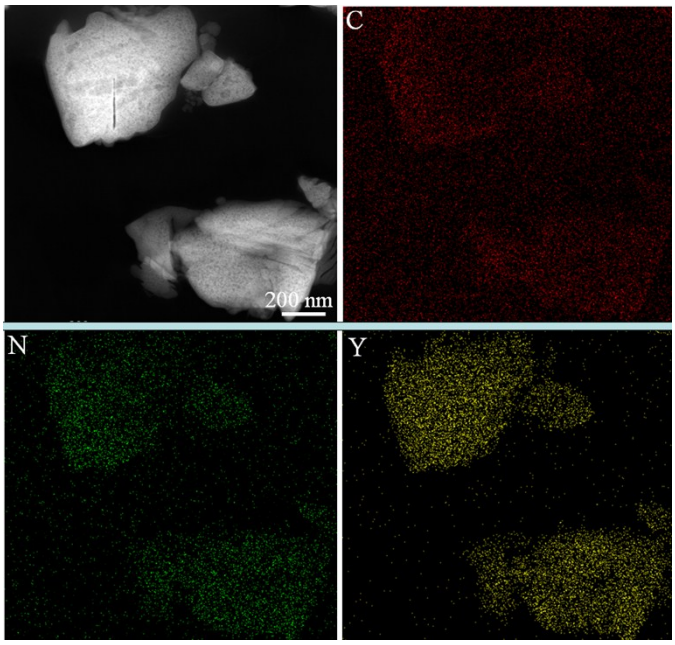

Fig. S12 EDS elemental mapping pattern of product prepared after 72 h.

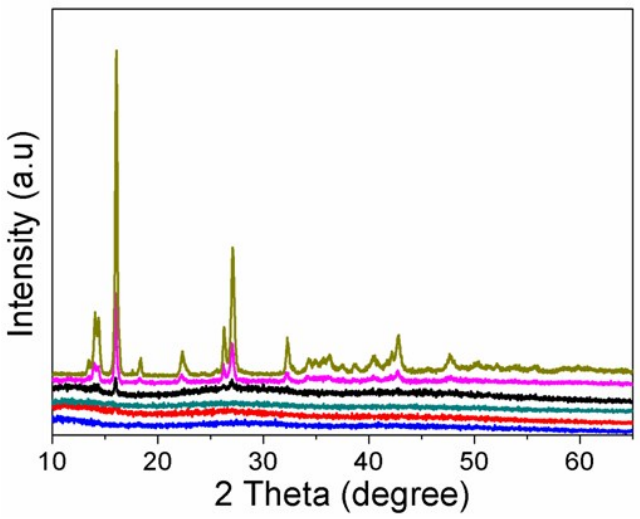

Fig. S13. XRD pattern of the products prepared after different eaction time of 2 h, 5 h, 12 h, 24 h, 48 h, 72 h.

Table S1 Elemental analysis and ICP of the product at different reaction time.

Element/time	2 h	5 h	24 h	72 h	96 h
N(%)	1.82	1.63	0.77	0.04	0.05
C(%)	18.62	19.73	18.43	18.85	18.67
H(%)	2.72	2.71	2.46	2.01	2.15
Y(%)	14.87	20.30	17.31	18.43	16.51
Yb(%)	7.59	6.86	5.79	6.06	5.95
Er(%)	3.16	2.47	2.64	2.74	2.97