

## Synthesis and phase transformation of NaGdF<sub>4</sub>: Yb-Er thin films using electro-deposition method at moderate temperature

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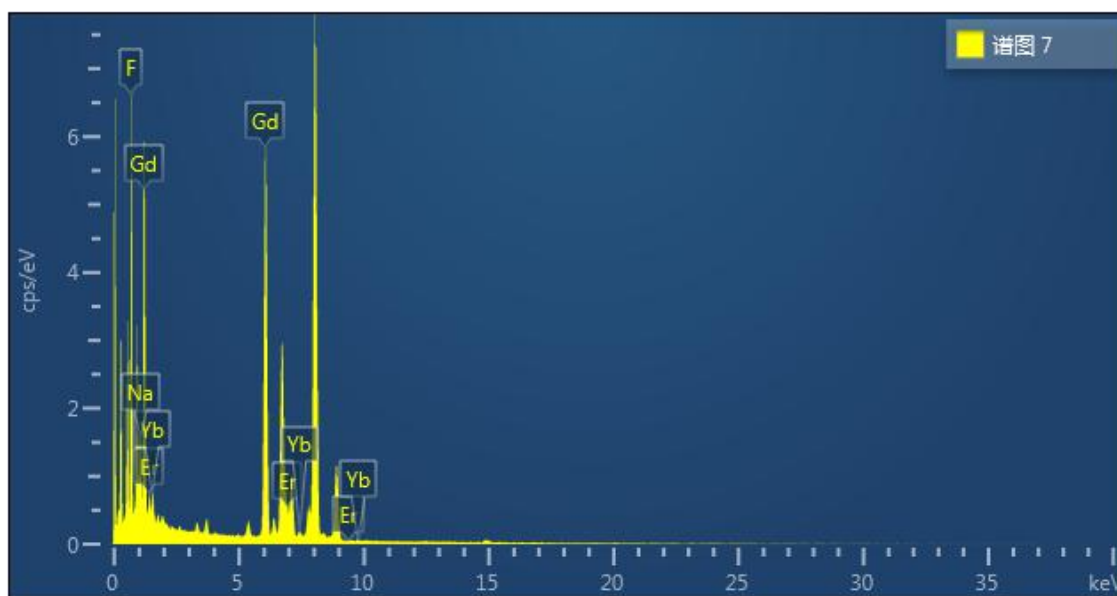


Figure S1. The energy dispersive X-ray analysis (EDX) of the  $\alpha$ -NaGdF<sub>4</sub>: Yb-Er.

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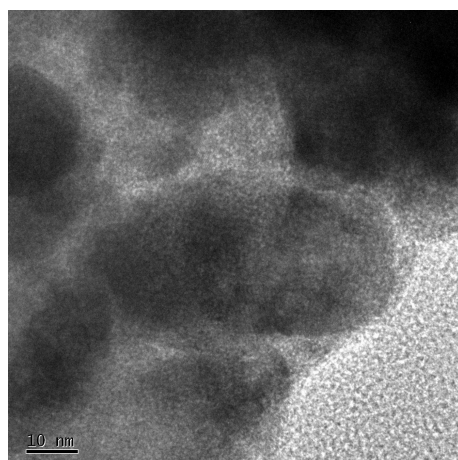
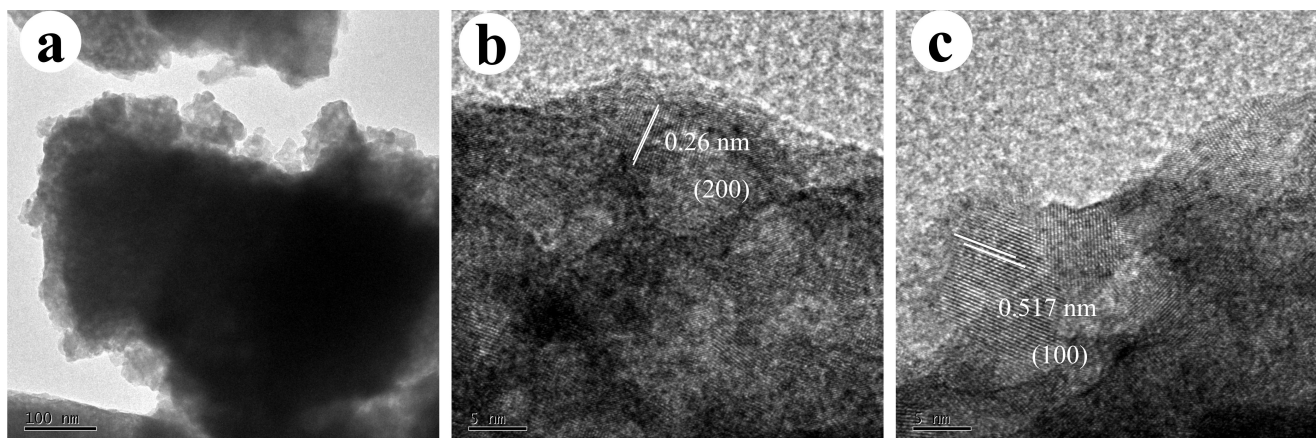
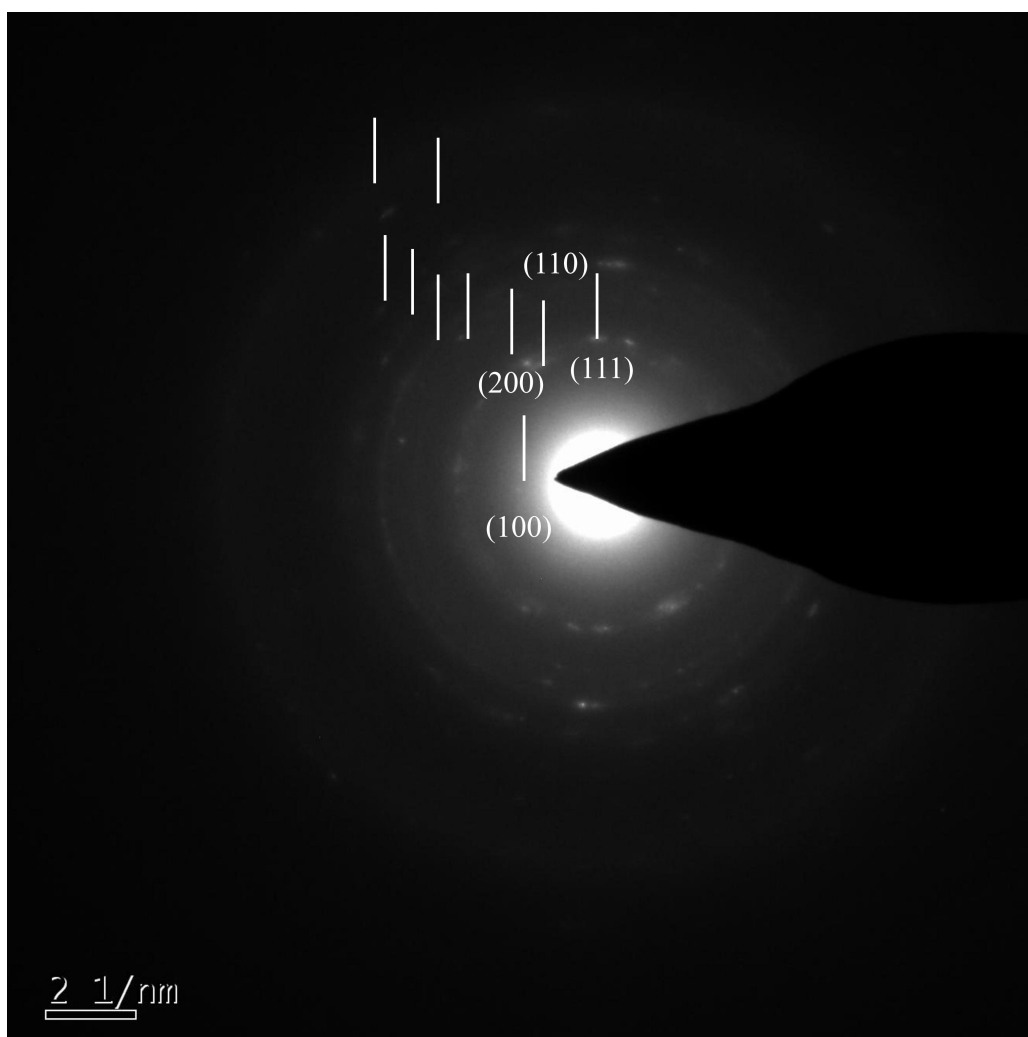


Figure S2. TEM images of the  $\beta$ -NaGdF<sub>4</sub>: Yb-Er thin films.



**Figure S3.** HRTEM images of the both  $\alpha$ - and  $\beta$ -NaGdF<sub>4</sub>: Yb-Er thin film: (a)  $\alpha$ - and  $\beta$ -NaGdF<sub>4</sub>: Yb-Er, (b) and (c) The corresponding HRTEM image.

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**Figure S4.** Selected electron diffraction pattern(SAED) of both both  $\alpha$ - and  $\beta$ -NaGdF<sub>4</sub>: Yb-Er.

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