

Ionic liquid/H₂O two-phase synthesis and luminescence properties of BaGdF₅:RE³⁺

(RE = Ce/Dy/Eu/Yb/Er) octahedrons

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Table S1 Synthetical conditions for BaGdF₅ and BaGdF₅:Ln³⁺ (Ln = Ce/Dy/Eu) samples

Sample	[Omim]BF ₄ mmol	Ba(NO ₃) ₂ mmol	Gd(NO ₃) ₃ mmol	Ce(NO ₃) ₃ mmol	Dy(NO ₃) ₃ mmol	Eu(NO ₃) ₃ mmol	Yb(NO ₃) ₃ mmol	Er(NO ₃) ₃ mmol	Temperature °C	Time h
BaGdF ₅	2.5	1.1	1.0	0.0	0.0	0.0	0.0	0.0	180	24
GdF ₃	2.5	1.1	1.0	0.0	0.0	0.0	0.0	0.0	120-160	24
GdF ₃	2.5	1.1	1.0	0.0	0.0	0.0	0.0	0.0	180	0.5
BaGdF ₅ :0.02Ce ³⁺ ,	2.5	1.1	0.98	0.02	0.0	0.0	0.0	0.0	180	24
BaGdF ₅ :0.02Dy ³⁺ ,	2.5	1.1	0.98	0.0	0.02	0.0	0.0	0.0	180	24
BaGdF ₅ : 0.04Eu ³⁺	2.5	1.1	0.96	0.0	0.0	0.04	0.0	0.0	180	24
BaGdF ₅ :0.02Ce ³⁺ , 0.02Dy ³⁺ ,	2.5	1.1	0.96	0.02	0.02	0.0	0.0	0.0	180	24
BaGdF ₅ :0.02Ce ³⁺ , 0.04Eu ³⁺	2.5	1.1	0.94	0.02	0.0	0.04	0.0	0.0	180	24
BaGdF ₅ :0.02Ce ³⁺ , 0.02Dy ³⁺ ,0.01Eu ³⁺	2.5	1.1	0.95	0.02	0.02	0.01	0.0	0.0	180	24
BaGdF ₅ :0.02Ce ³⁺ , 0.02Dy ³⁺ , .04Eu ³⁺	2.5	1.1	0.92	0.02	0.02	0.04	0.0	0.0	180	24
BaGdF ₅ :0.10Yb ³⁺ , 0.05Er ³⁺	2.5	1.1	0.85	0.0	0.0	0.0	0.1	0.05	180	24
BaGdF ₅ :0.30Yb ³⁺ , 0.05Er ³⁺	2.5	1.1	0.65	0.0	0.0	0.0	0.3	0.05	180	24

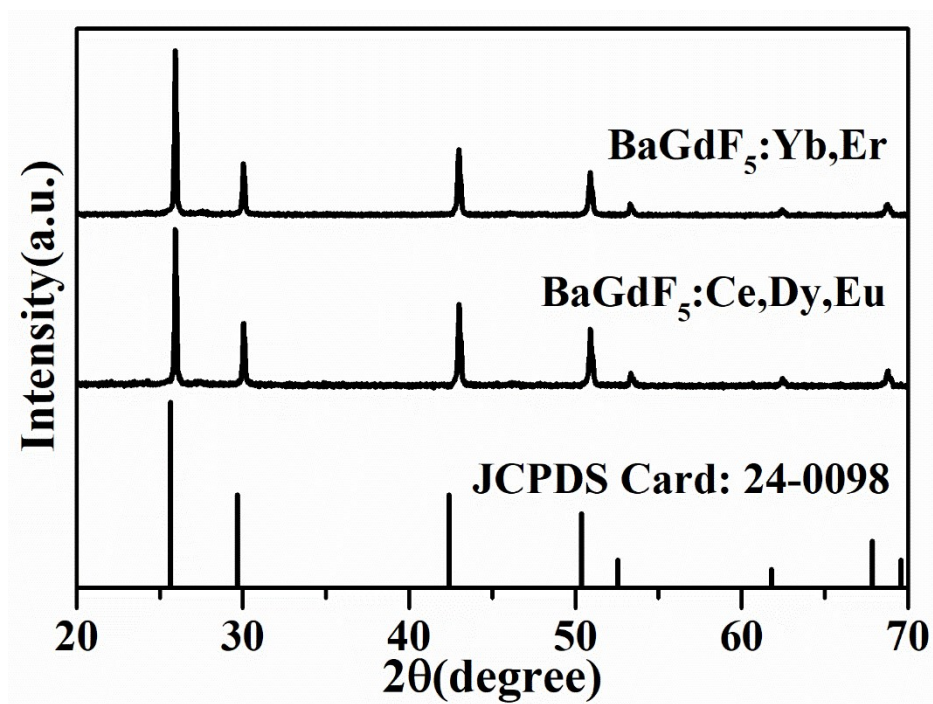


Figure S1 XRD patterns of BaGdF₅:Ce,Dy,Eu and BaGdF₅:Yb, Er.

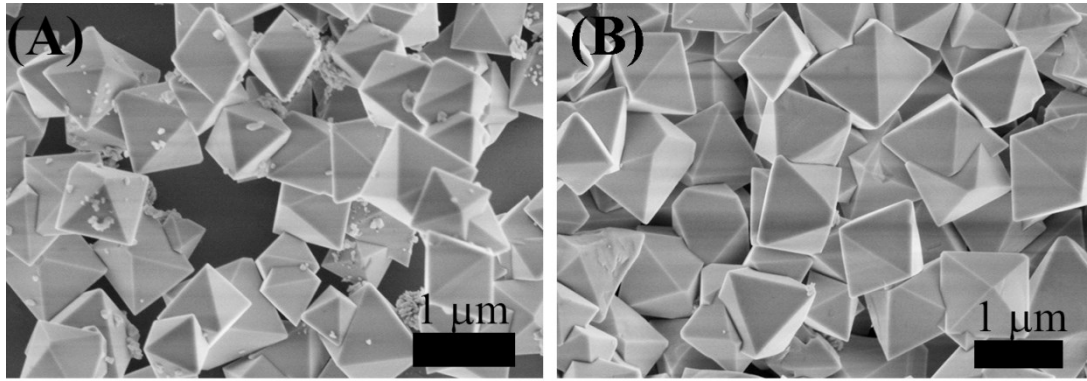


Figure S2 SEM images of $\text{BaGdF}_5: 0.02\text{Ce}, 0.02\text{Dy}, 0.04\text{Eu}$ and $\text{BaGdF}_5:0.10\text{Yb}, 0.05\text{Er}$.

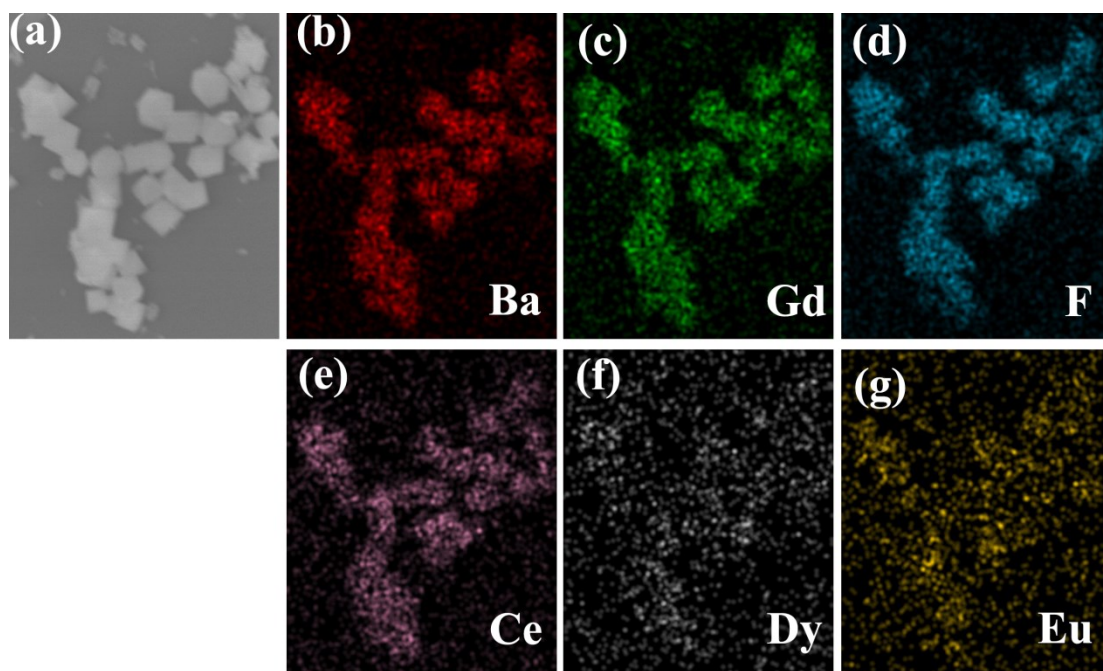


Figure S3 SEM and element mapping images of BaGdF₅: 0.02Ce, 0.02Dy, 0.04Eu

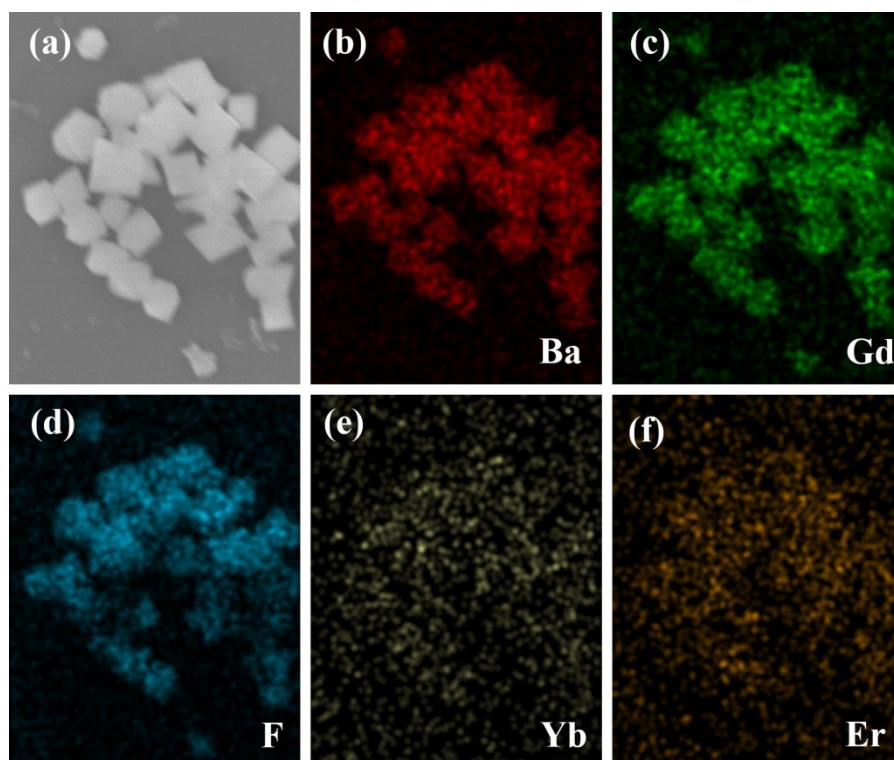


Figure S4 SEM and element mapping images of BaGdF₅: 0.10Yb, 0.05Er