

Supplementary Material

Efficient red luminescence in Eu³⁺ doped CdSe/CdS all-inorganic quantum dot shows great potential for wLED

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Part 1 Supplementary Figures

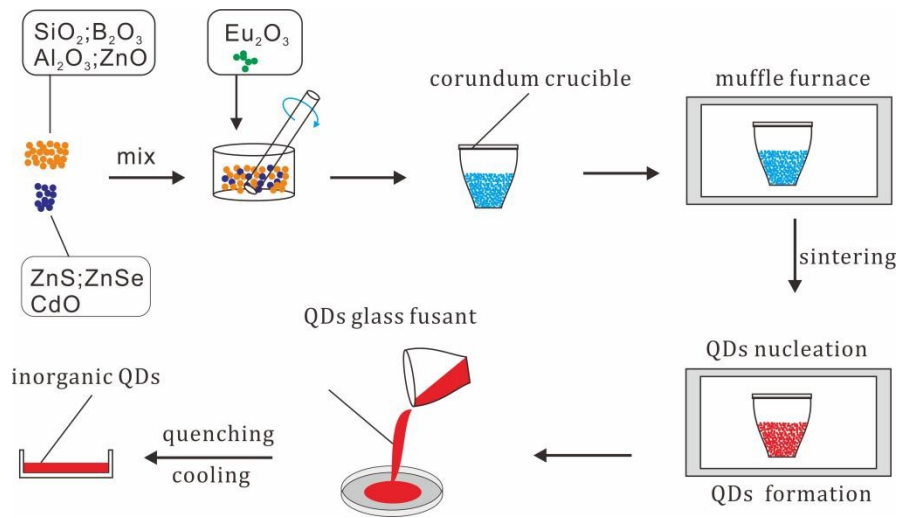


Fig.S1 Preparation procedure of the inorganic CdSe/CdS:Eu³⁺ QDs

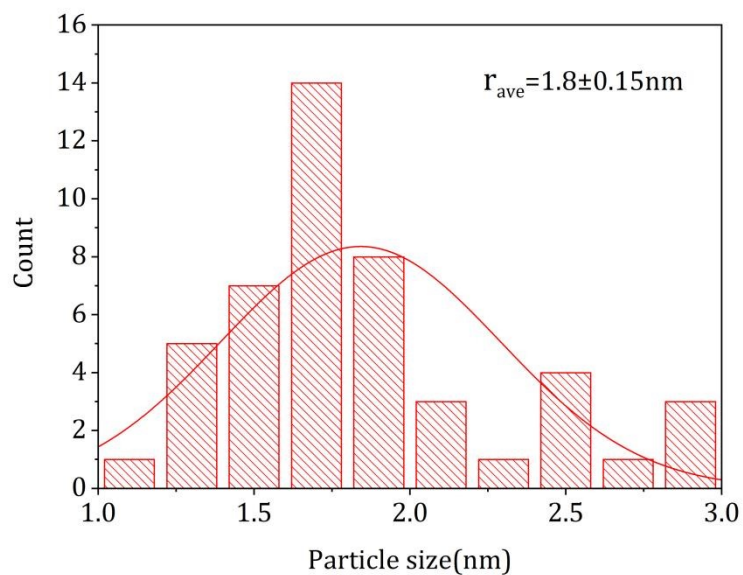


Fig.S2 Particle size distribution of the inorganic CdSe/CdS:Eu³⁺ QDs

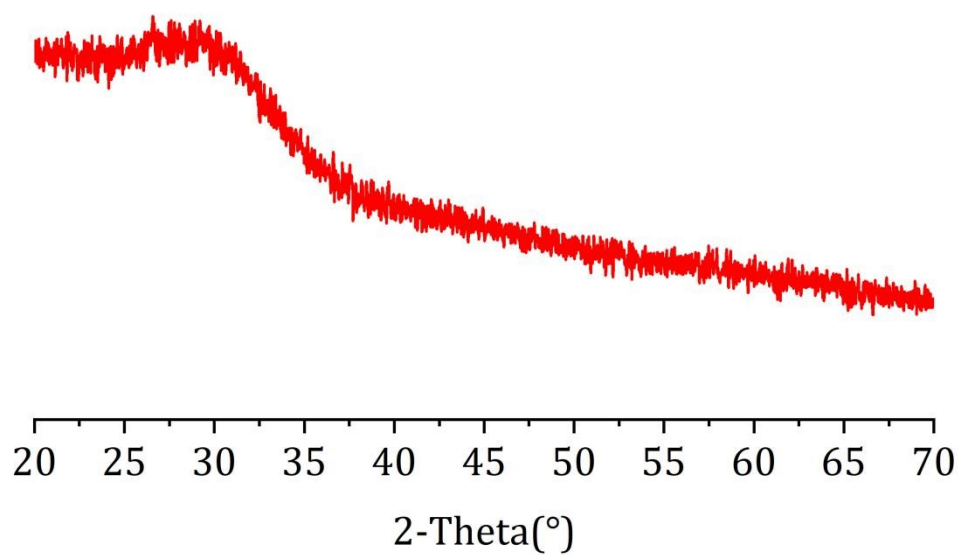


Fig.S3 XRD patterns of the CdSe/CdS samples without Eu ions doping

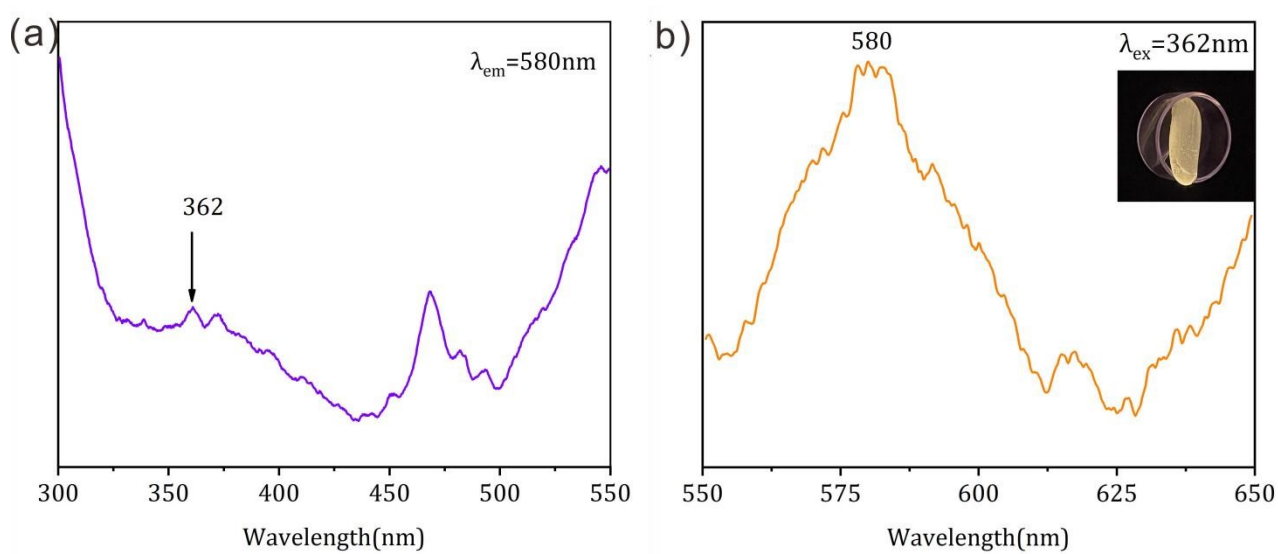


Fig.S4 PL excitation (a) and emission(b) spectra of the inorganic CdSe/CdS QDs without Eu doping; inset: the optical image of the inorganic CdSe/CdS QDs under excitation of 362nm

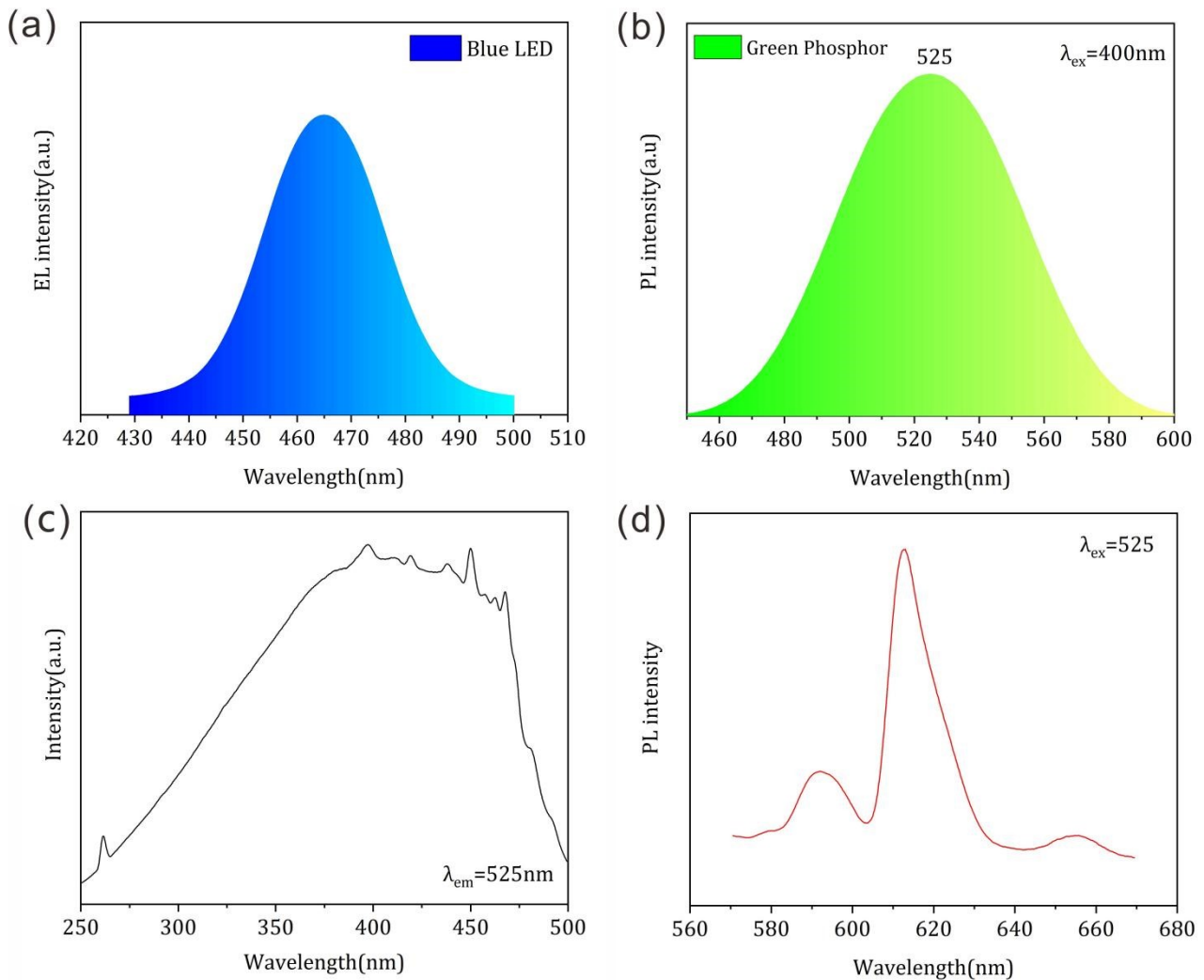


Fig.S5 (a) EL spectrum of the GaN blue LED chip; (b) PL spectrum of the commercial Intematix G2762 green phosphor; (c) PL excitation spectrum of the commercial Intematix G2762 green phosphor; (d) PL emission spectrum of the CdSe/CdS:Eu³⁺ QDs

Part 2 Preparation procedure of wLED

Firstly, Milling the CdSe/CdS:Eu³⁺ QDs glass in to powders, and mixed homogeneously with the commercial green phosphor (Intematix G2762). Then the mixture were preforming into a circular sheet with thickness of 0.25mm by a sheeting out tablet press. And this circular sheet was transfered to a muffle furnace at 570 °C for 1 h under ambient atmosphere with heating rate of 5°C/min. After the temperature cool down to room temperature naturally, the solid glass mixture consist of inorganic QDs and phosphor were mounted on a InGaN blue LED chip (465 nm) with help of ethoxyline resin (AB glue) to assemble the wLED. As you required, we

supplemented the detail assemble process of the wLED using the prepared inorganic QDs and commercial green phosphor as well as InGaN blue LED chip in the supplementary materials. Generally, the preparation of wLED could be depicted by Fig.S6.

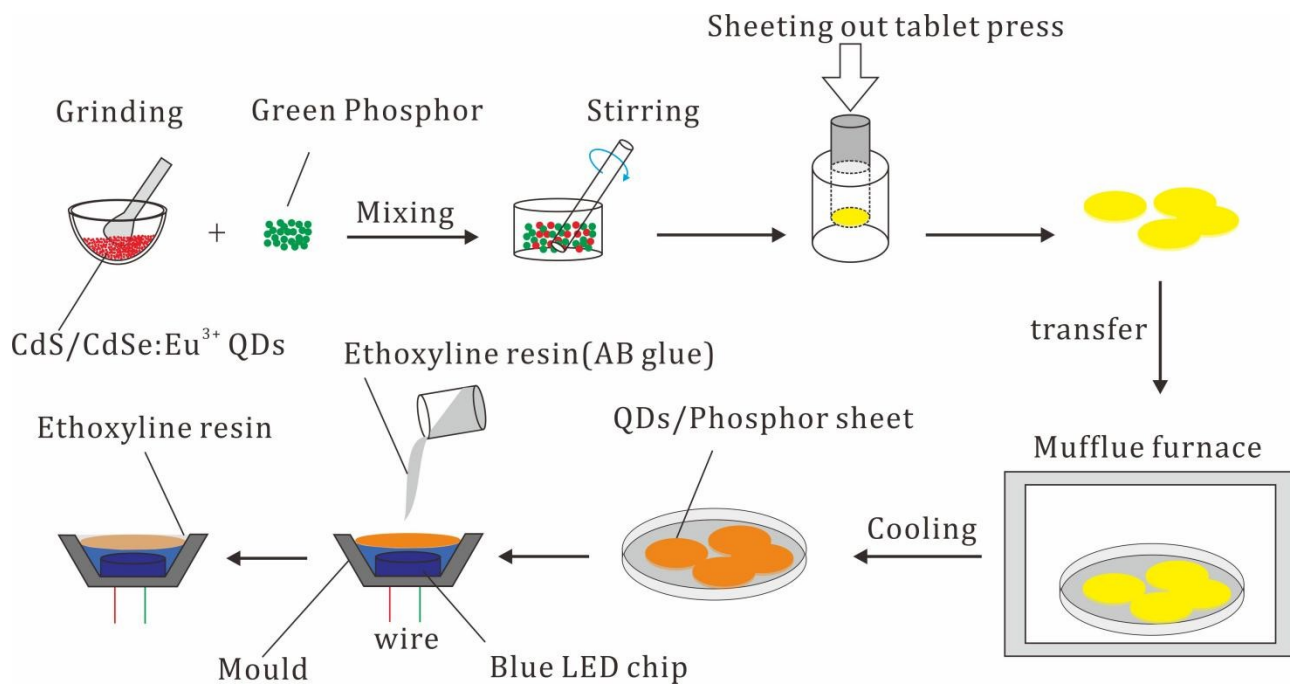


Fig.S6 The preparation procedure of wLED

Part 3 The long-term optical performance of the inorganic CdSe/CdS:0.8% Eu³⁺ QDs

In order to investigate the long-term optical performance of the inorganic CdSe/CdS:Eu³⁺ QDs, we fixed the Eu concentration at 0.8% mol, and test its PL emission spectra, optical photos, quantum yield (QY), and CIE chromaticity coordinates at 30 days and day 60 days, respectively when QDs were placed under ambient atmosphere. The results were given in Fig.S7 and Table S1.

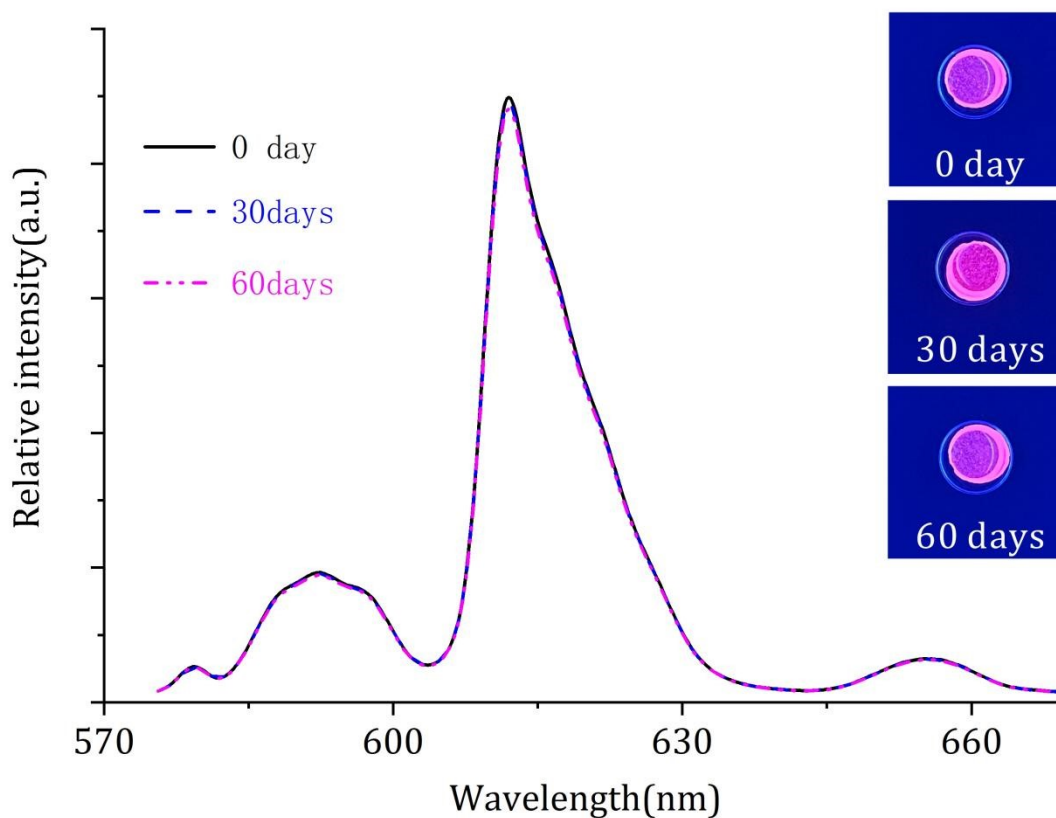


Fig.S7 PL emission spectra of of the inorganic CdSe/CdS:Eu³⁺ QDs at 30days and 60days; the corresponding optical photos under excitation at 465nm also was inserted

Table S1. The CIE chromaticity coordinates and QY of the inorganic CdSe/CdS:Eu³⁺ QDs at 30days and 60days

CdSe/CdS:0.8% Eu ³⁺ QDs	Color coordinates (x,y)	QY
0 day	0.6531, 0.3463	53.5%
30 days	0.6531, 0.3464	53.5%
60 days	0.653, 0.3463	53.4%