Supporting Information

Polycrystalline Er-doped $Y_3Ga_5O_{12}$ nanofilms fabricated by atomic layer deposition on silicon at low temperature and the exploration on electroluminescent performance

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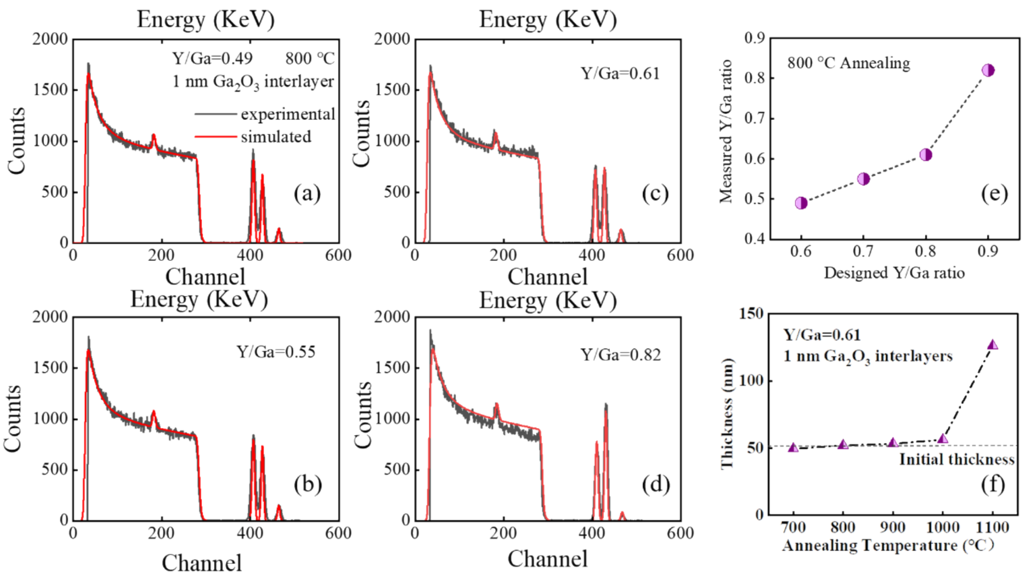

Fig. S1 (a-d) The RBS signals from the YGG:Er nanofilms with different compositions (nominal designed Y/Ga = 0.6, 0.7, 0.8 and 0.9) after annealing at 800 °C, the fitting results are compared in (e). (f) The dependence of film thickness on annealing temperature for the YGG:Er nanofilm with Y/Ga=0.61.

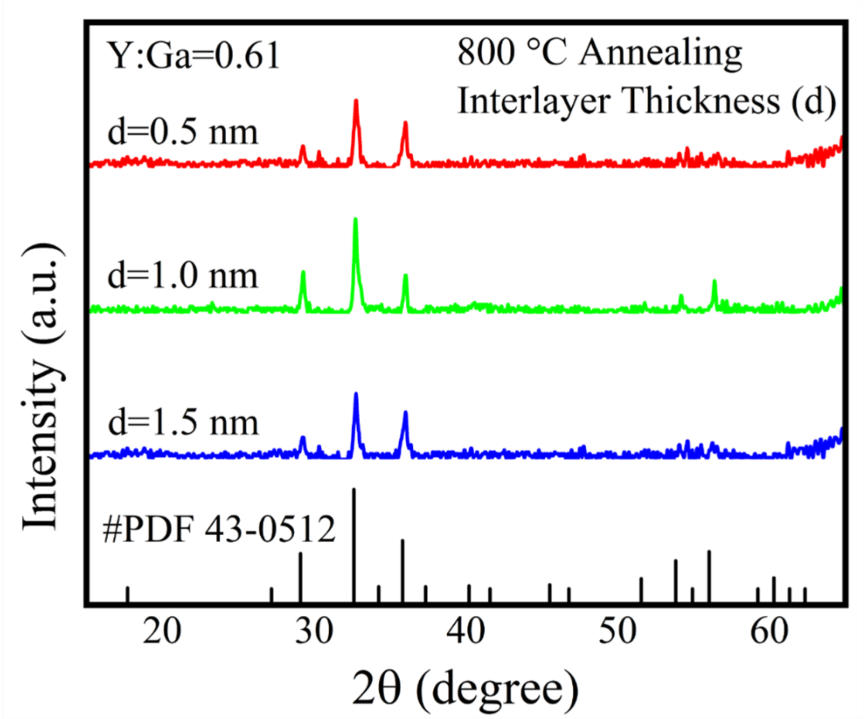

Fig. S2 XRD patterns of the 800 °C annealed YGG:Er (Y/Ga=0.61) nanofilms with different Ga_2O_3 interlayer thickness (d = 0.5/1/1.5 nm).

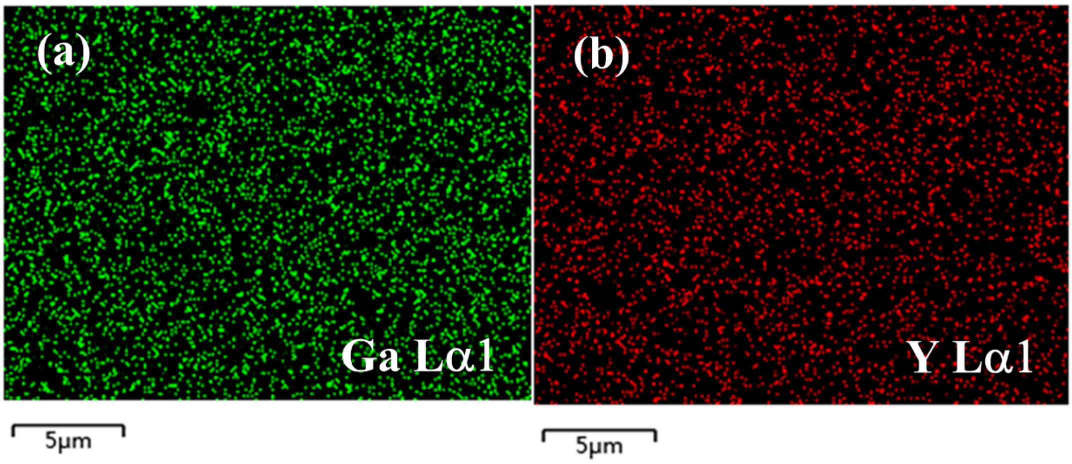

Fig. S3 EDS mapping of the 800 °C annealed YGG:Er (Y/Ga=0.61) nanofilms.

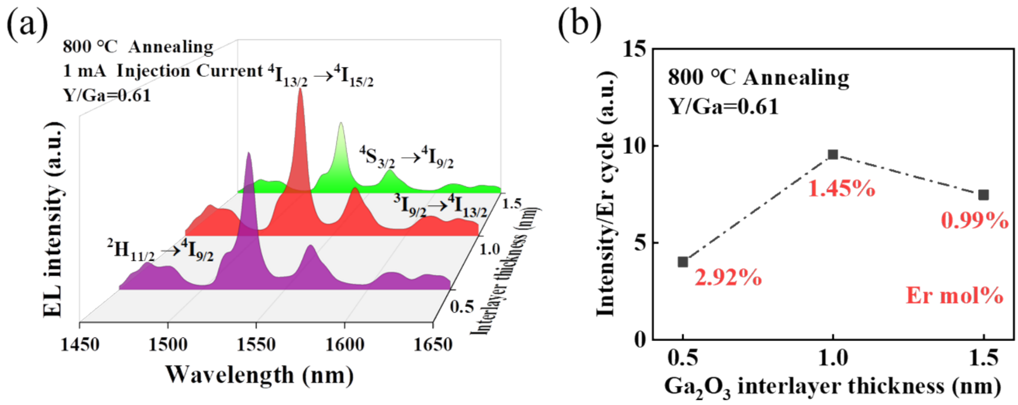

Fig. S4 For the MOSLEDs based on the polycrystalline YGG:Er (Y/Ga=0.61) nanofilms annealed at 800 °C. (a) The NIR EL spectra from the MOSLEDs with different Ga_2O_3 interlayer thickness (d = 0.5/1/1.5 nm) under the same injection current, and (b) The comparison of the 1530 nm EL intensities from each Er_2O_3 dopant cycle as a function of the Ga_2O_3 interlayer thickness (different Er doping concentrations).

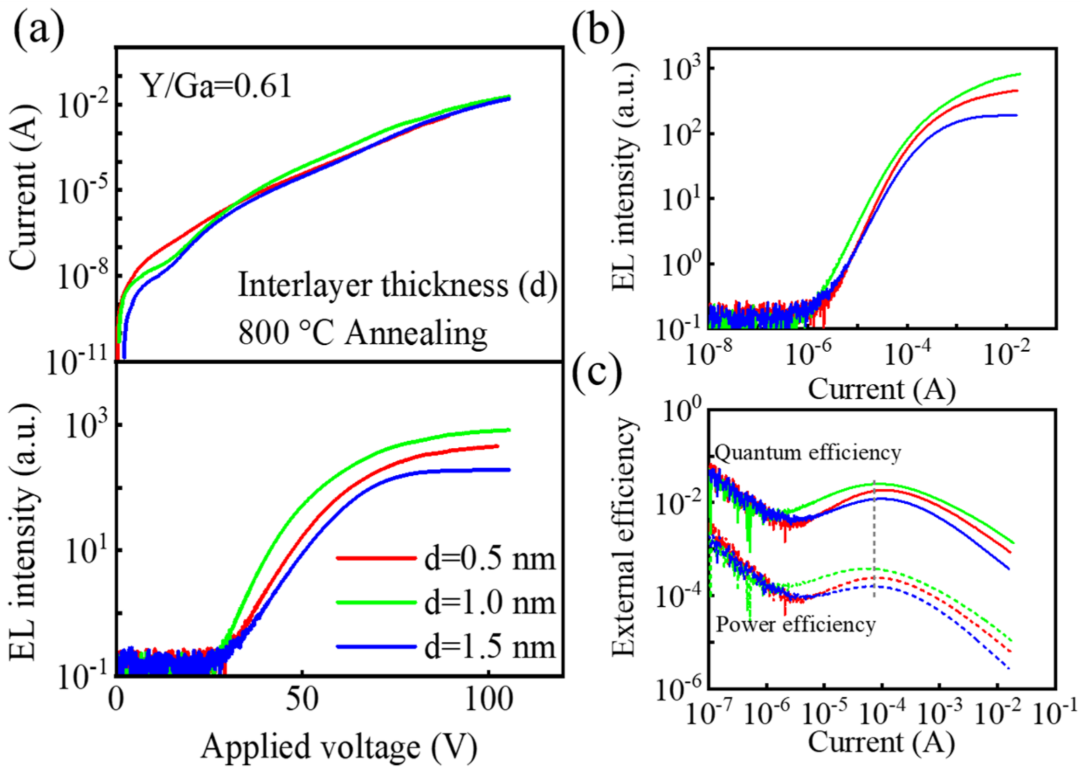

Fig. S5 For the YGG:Er (Y/Ga=0.61, annealed at 800 °C) MOSLEDs with Ga_2O_3 interlayers of different thicknesses. The dependence of (a) 1530 nm EL intensities and injection currents on the applied voltages, (b) the EL-I relationship, and (c) their power efficiencies and external quantum efficiencies as a function of the injection currents.

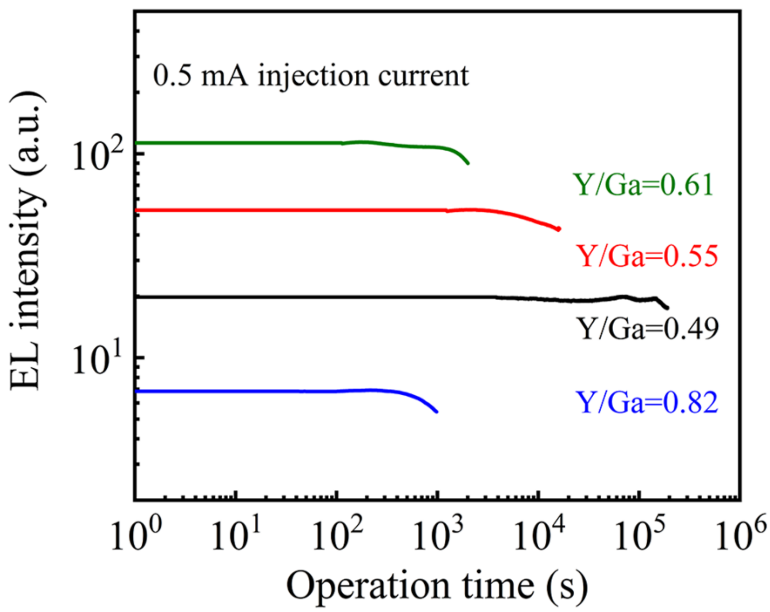

Fig. S6 The EL intensity recorded continually for the 800 °C annealed YGG:Er MOSLEDs with different Y/Ga ratios, which were recorded continually under 0.5 mA.