Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
This journal is © The Royal Society of Chemistry 2016

Supporting information

Highly Efficient Green Phosphorescent Organic Light-Emitting Diodes with Small Efficiency Roll-Off Based on Iridium Complexes Bearing Oxadiazol-Substituted Amide Ligands

Fuli Zhang,[a] Weiling Li,[b] Yue Yu,[c] Yiming Jing,[d] Dongxin Ma,[e] Fuqiang Zhang,[a] Suzhi Li,[a] Guangxiu Cao,[a] Zhongyi Li,[a] Ge Guo,[a] Bin Wei,*[b] Depan Zhang,[a] Lian Duan,[e] Chunyang Li,[a] Yafei Feng,[a] and Bin Zhai*[a]

[a] *College of Chemistry and Chemical Engineering, Shangqiu Normal University, Shangqiu 476000, P. R. China.*

[b] *School of Materials Science and Engineering, Shanghai University, Shanghai 200072, P. R. China.*

[c] *Key Laboratory of Photonics Technology for Information, Xi'an Jiaotong University, Xi'an 710049, P. R. China.*

[d] *State Key Laboratory of Coordination Chemistry, Collaborative Innovation Center of Advanced Microstructures, Collaborative Innovation Center of Chemistry for Life Sciences, School of Chemistry and Chemical Engineering, Nanjing University, Nanjing 210093, P. R. China.*

[e] *Key Lab of Organic Optoelectronics and Molecular Engineering of Ministry of Education, Department of Chemistry, Tsinghua University, Beijing 100084, P. R. China.*

E-mail: zhaibin_1978@163.com; bwei@shu.edu.cn

Contents:

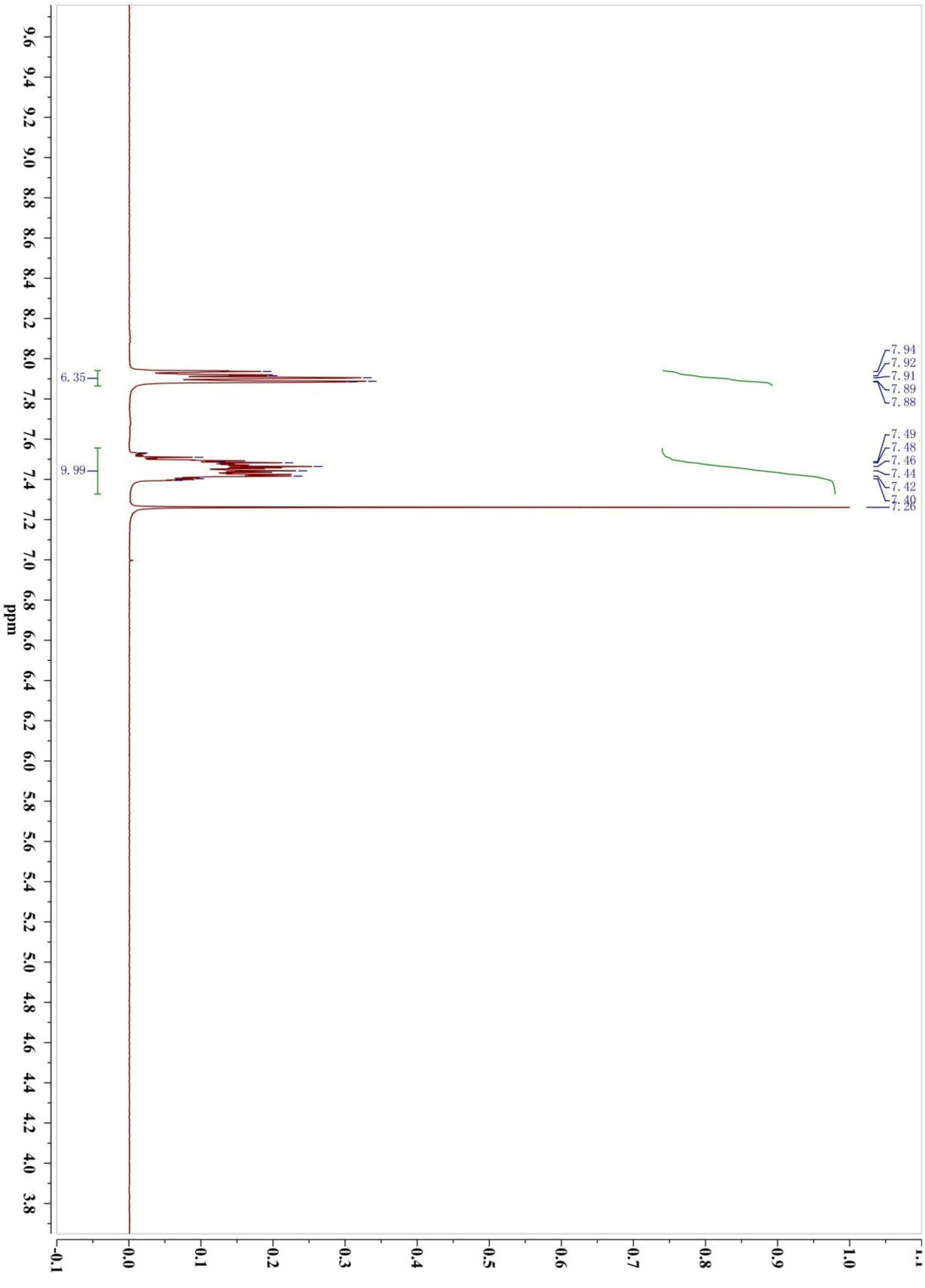

Figure S1. ¹H-NMR (600 M) spectrum of HPOXD in Chloroform-*d*.

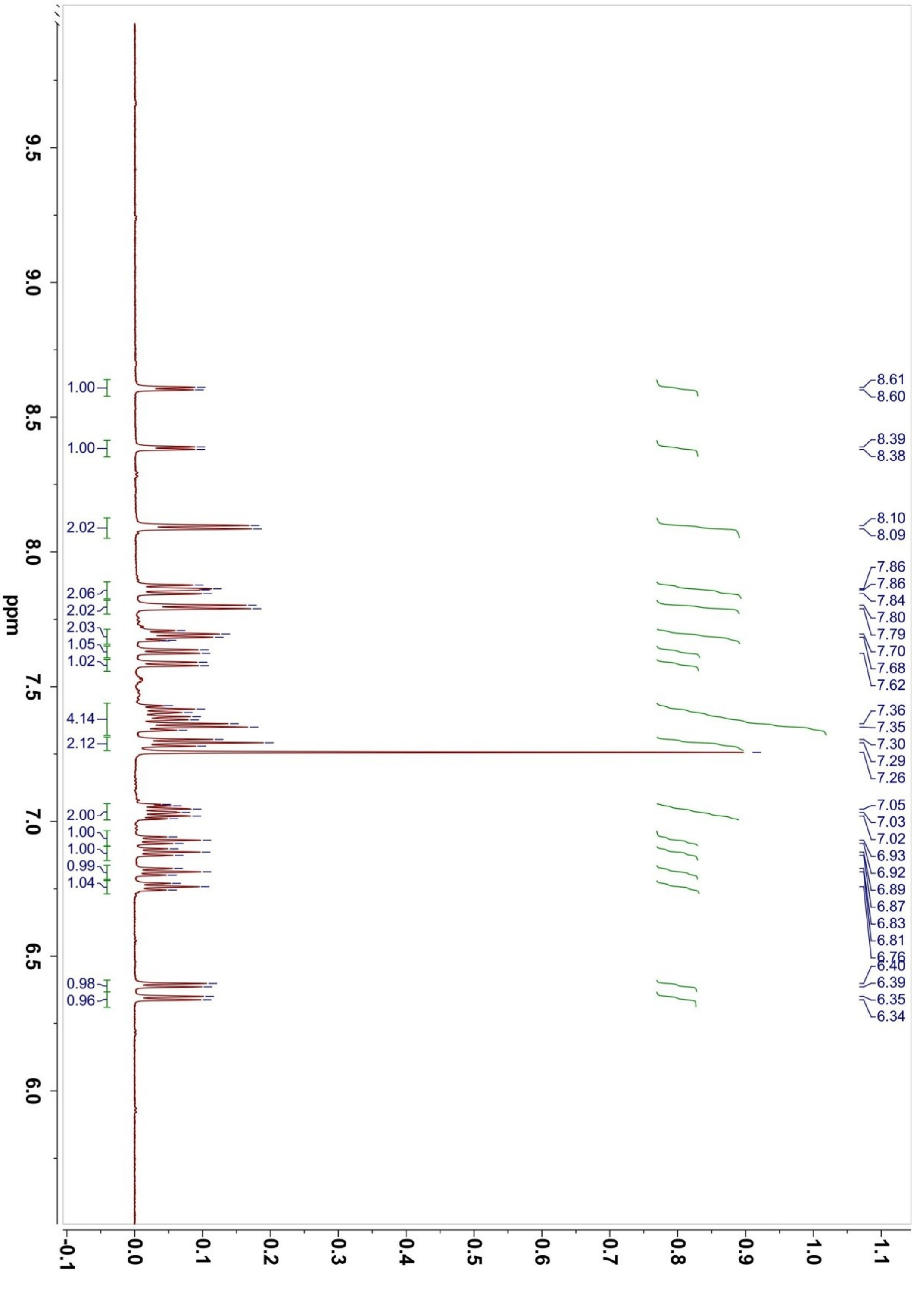

Figure S2. ^{1}H-NMR (600 M) spectrum of complex **1** in Chloroform-*d*.

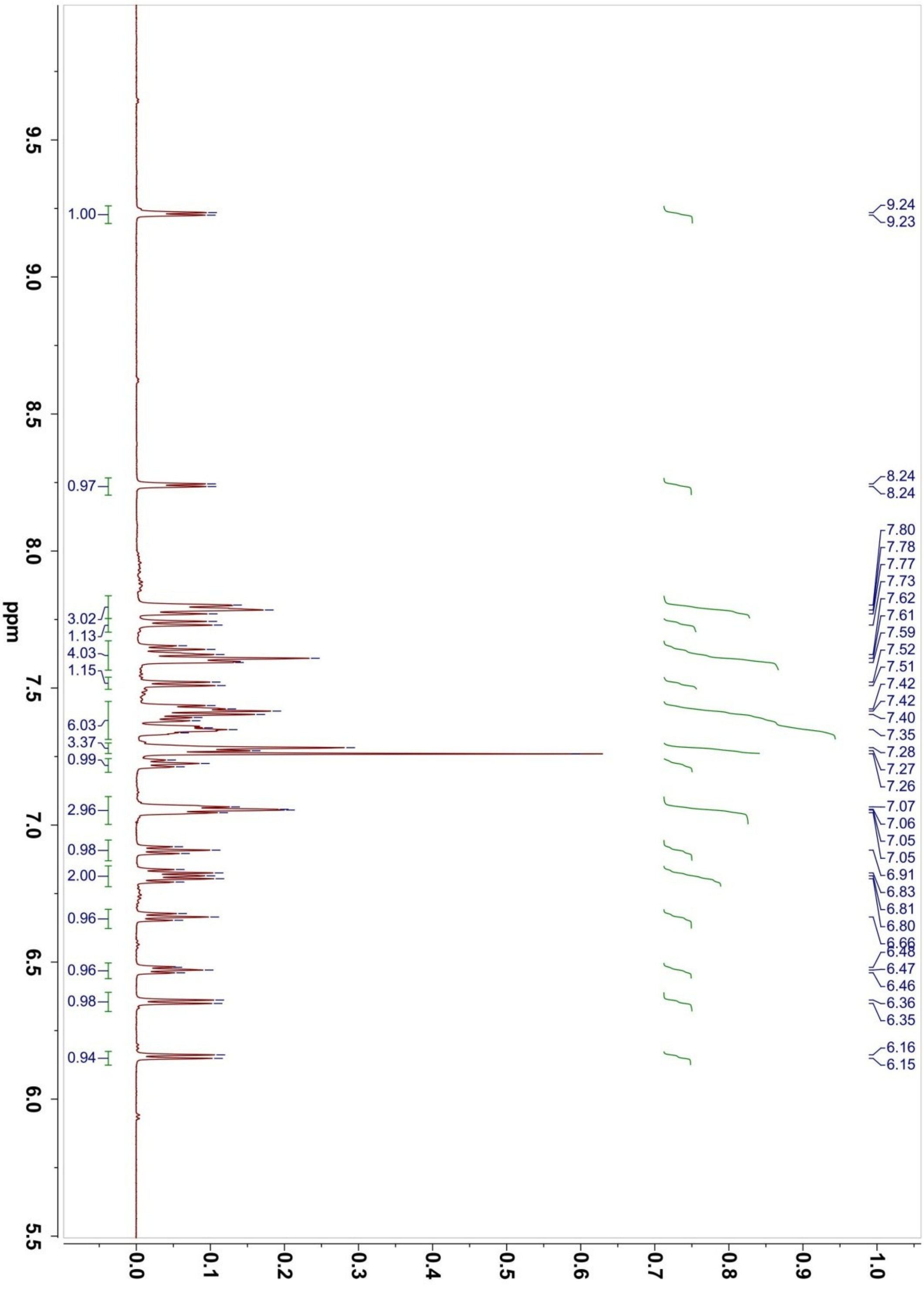

Figure S3. ^{1}H-NMR (600 M) spectrum of complex **2** in Chloroform-*d*.

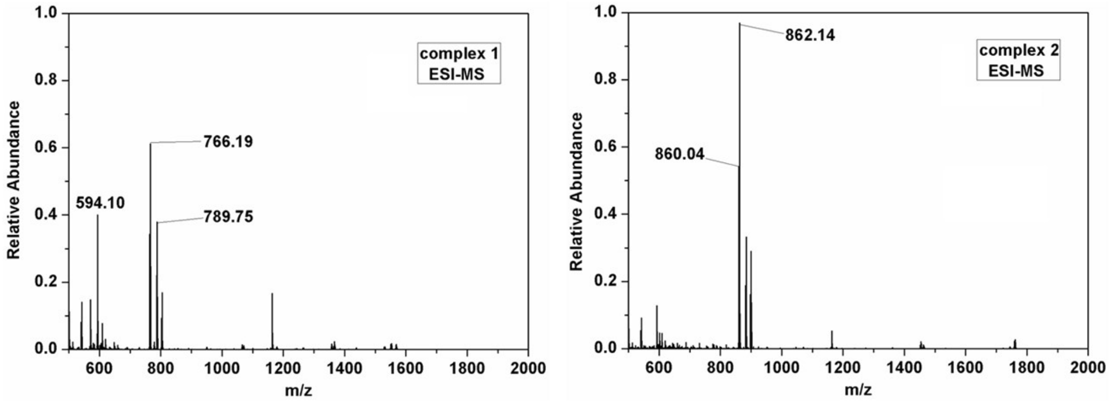

Figure S4. ESI-MS spectra of complexes **1** and **2**.

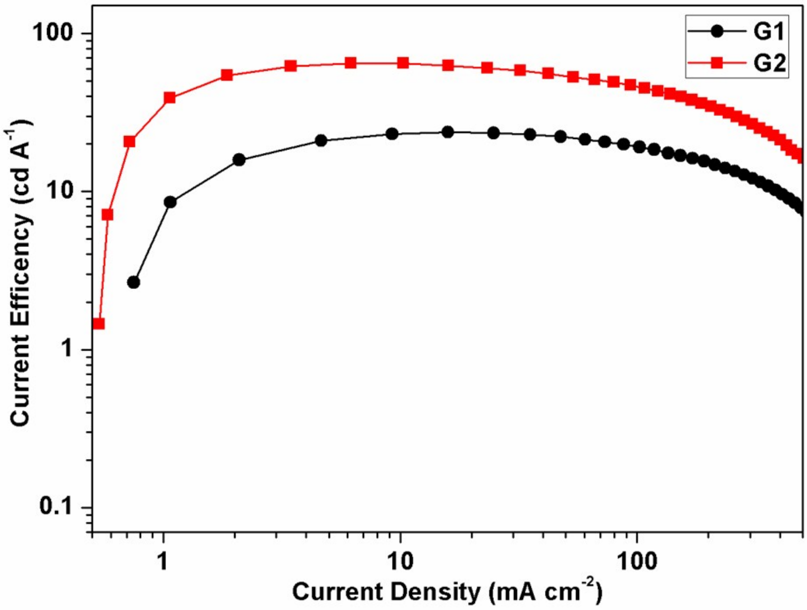

Figure S5. Current density – Current efficiency curves of devices G1 and G2.

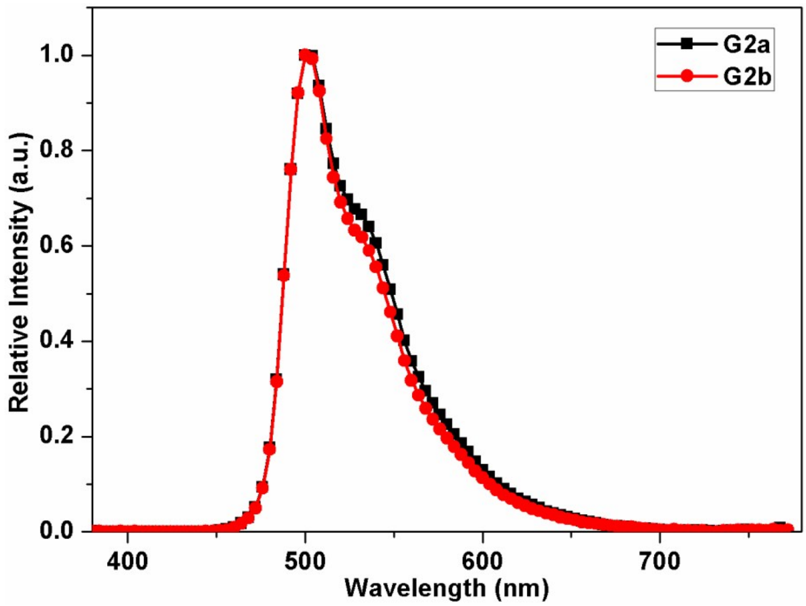

Figure S6. Electroluminescence spectra of devices G2a and G2b at 6 V.

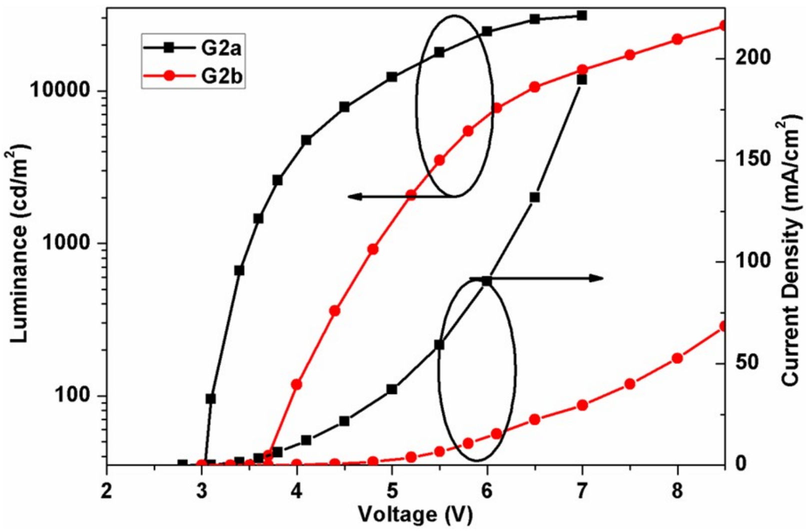

Figure S7. $V-L-J$ curves of devices G2a and G2b.

The procedure to calculate the external quantum efficiency (η_{ext}):

The OLEDs were placed in focus plane of spectrophotometer and all emitted photons within an angle of 10 degrees from the uniform glass side were captured. The η_{ext} was calculated by taking in the forwarding-direction brightness (L_0), current density (J) and electroluminescence spectra into consideration:

$$\eta_{ext} = \frac{\pi e L_0}{K_m hcJ} \frac{\int I(\lambda)\, \lambda d\lambda}{\int I(\lambda)\, V(\lambda) d\lambda}$$

whereas e is elementary charge ($e = 1.6 \times 10^{-19} C$), h is Planck constant ($h = 6.62 \times 10^{-34}\ J \cdot s$), c is speed of light ($c = 2.9999 \times 10^{8} m / s$), K_m is a constant ($K_m = 683\ lm / W$). The $I(\lambda)$ is the normalized luminescence intensity in specific wavelengths and $V(\lambda)$ is the normalized visibility function (photopic vision) in specific wavelengths.

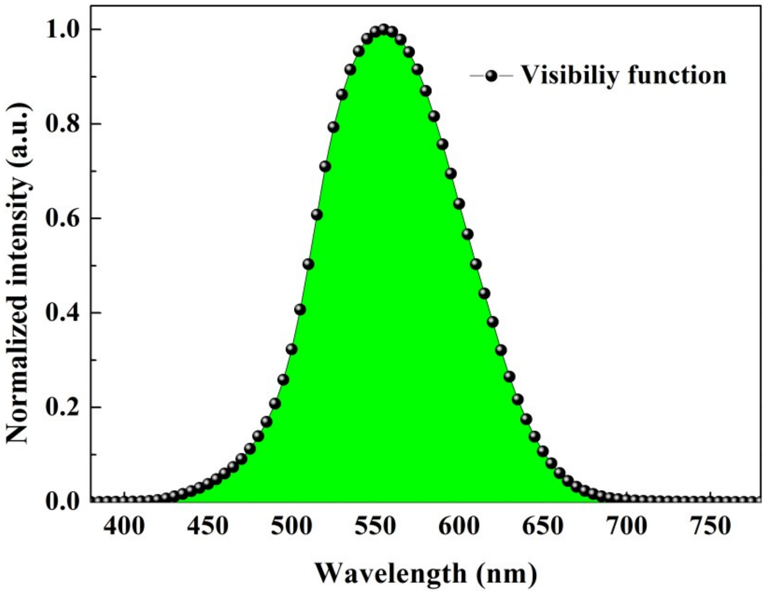

Figure S8. Visibility function curve in photopic vision.

First, The constant values were substituted into the calculation and the constant coefficient of $\frac{\pi e}{K_m hc}$ was obtained. The $\frac{L_0}{J}$ represented the current efficiency of devices.

Next, the integral formula of $\frac{\int I(\lambda)\lambda d\lambda}{\int I(\lambda)V(\lambda)d\lambda}$ was calculated based on the overlap area across the whole visible range (300-800 nm).