Supporting Information

High Color Rendering Index Trichromatic White and Red LEDs Prepared from Silane-Functionalized Carbon Dots

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Figure S1. FTIR spectra of *p*-phenylenediamine



Figure S2. EL spectra of WLEDs made from blue LEDs chips, G-SiCDs and R-SiCDs with different ratios of G-SiCDs to R-SiCDs (I-VI).



Figure S3. CIE coordinates of WLEDs made from blue LEDs chips, G-SiCDs and R-SiCDs with different ratios of G-SiCDs to R-SiCDs (I-VI).

Table S1. Biexponential fit values at the excitation of 485 nm and relative QYs of G-SiCDs

 and R-SiCDs measured at the excitation of 360 and 495 nm, respectively.

Samples	λ_{ex}/nm	$\alpha_1/\%$	τ_{l}/ns	α ₂ /%	τ_2/ns	$\tau_{av}\!/\!ns$	QY/%
G-SiCDs	485	3.52	8.108	5.25	2.528	6.63	16.4 (λ_{ex} =360 nm)
R-SiCDs		3.542	8.64	6.585	1.574	6.85	5.5 (λ_{ex} =495 nm)



Figure S4. Relative PL intensity of WLEDs based on SiCDs and yellow phosphors after 120 °C aging treatment.

QY Measurements: In detail, we choose rhodamine B (QY=89% at 495 nm excitation in ethanol) as reference sample to measure QY of R-SiCDs. We choose quinine sulfate (QY=56% at 365 nm excitation in $0.1M H_2SO_4$) as reference sample to measure QY of G-SiCDs. The QY of a sample was then calculated according to the following equation:

$$\varphi = \varphi' \times \frac{A'}{I'} \times \frac{I}{A} \times \frac{n^2}{n'^2}$$

where ϕ is the QY of the testing sample, I is the testing sample's integrated emission intensity, n is the refractive index (1.33 for water and 1.36 for ethanol), and A is the optical

density. The superscript "" refers to the referenced fluorescence dyes of known QYs. To obtain more reliable results, a series of solutions of CDs and referenced fluorescence dyes were prepared with concentrations adjusted such that the optical absorbance values were between 0-0.1 at 365/495 nm. Then Plots of integrated PL intensity of CDs and referenced dye as a function of optical absorbance at 365/495 nm and relevant data, after linear fitting, we can get the slope for the CDs and referenced dye, then we can calculate the QY of CDs according to the abovementioned equation.