Supporting Information for
A facile strategy for new organic White LED hybrid devices: design, features and engineering.

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Materials

¹H NMR spectra were recorded on 400 and 500 MHz Varian spectrometers at 27°C using CDCl₃ as solvent. ¹³C NMR were recorded at 101 and 126 MHz at 27°C using CDCl₃. Chemical shifts (δ) are given in ppm. Coupling constants (J) are reported in Hz. Yields refer to chromatography and spectroscopically pure materials.

coumarin Dye -1 NMR data

7-Diethylamino-2-oxo-2H-chromene-3-carboxylic acid ethyl ester. Mp 85-87

*C. ¹H NMR (500 MHz, CDCl₃) δ: 8.41 (s, 1H) 7.35 (d, J =9.0 Hz 1H) 6.61 (dd, J = 9.0 ,2.3 Hz, 1H) 6.43 (d , J =2.0 Hz, 1H 4.37 (q, J = 7.1 Hz 2H) 3.45 (q, J = 7.1 Hz 4H) 1.39 (t, J =7.1 Hz, 3H) 1.23 (t, J = 7.2 Hz 6H); ¹³C NMR (126 MHz, CDCl₃) δ: 163.9, 158.2, 158.0 152.7 148.9 130.8 109.3 108.5 107.4 96.4 60.8 44.9 14.18

ESI mass calc. for C₁₆H₁₉NNaO₄: 312.1212, found: (M+Na) 312.1205.
Figure S1A Dye 1 $^1$H-NMR spectrum,

Figure S1B – dye 1 $^{13}$C-NMR spectrum
Quantum Yield Measurements ($\phi_f$)

Absolute quantum yield fluorescence were obtained by absorption and emission measurements with respect to reference sample. Considering the emission wavelength of the Dye -1 at about 450 nm and between 350 and 450 nm, the chosen reference solution of Coumarin 153 in EtOH was chosen.

The Quantum Yield can be calculated by the equation:

$$\phi_f = \frac{m_f n_f^2}{m_{std} n_{std}^2} \phi_{std}$$

Where subscripts of $f$ and std denoted test and standard condition; $m$ is the gradient from the plot of the integrated fluorescence intensity vs the absorbance at the excitation wavelength; $n$ is the refractive index of solvents.

In order to minimize re-absorption and non-linear effects, the concentration of the solution were chosen in order that absorbance values remain always below 0.1.

Figure S2 reports Abs vs integrated luminescence for Dye -1 in CHCl$_3$ solution and for Coumarine 153 in EtOH. Table S1 reports the value utilized for the calculation of the quantum yield ($\phi_f = 0.91$).

<table>
<thead>
<tr>
<th>$m_{std}$</th>
<th>$m_x$</th>
<th>$n_{std}$</th>
<th>$n_x$</th>
<th>$\phi_{std}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>11105</td>
<td>22736</td>
<td>1.34</td>
<td>1.45</td>
<td>0.38</td>
</tr>
</tbody>
</table>
Figure S3 Normalized light output intensity as a function of the working time (device C in Figure 10). The emission spectra did not change during the exposed time (inset).

Figure S4 Luminescence intensity vs film temperature.