## **Supplementary Information**

Solution processed naphthalene diimide derivative as an effective electron transport material for enhanced brightness and efficiency in polymer light emitting diodes

L. J. Rozanski<sup>a</sup>, Evandro Castaldelli<sup>b</sup>, F. Laurent M. Sam<sup>a</sup>, Christopher A. Mills<sup>a</sup>, Grégoire Jean-François Demets<sup>b</sup> and S. Ravi P. Silva<sup>a§</sup>

<sup>a</sup>Advanced Technology Institute, The University of Surrey, Guildford, United Kingdom, GU2 7XH, <sup>§</sup>Corresponding author: <u>s.silva@surrey.ac.uk</u>

<sup>b</sup> Departamento de Química, Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Av. Bandeirantes 3900 CEP 14040-901, Ribeirão Preto, SP, Brazil.



**DC18 energy levels** 

**Fig. 1** - DC18 UV-Vis absorption spectrum of an aqueous solution of DC18 using a quartz cuvette of 1.0 cm optical path. Taken using a HP 8453 Diode Array Spectrophotometer.

From Fig. 1, the linear fit returned  $y = 9.57x - 30.0 \rightarrow E_g(opt) = 3.1 \text{ eV}$ 



**Fig. 2** - Cyclic voltammetry of a drop-cast film onto GCE. Potentials measured against a Ag|AgCl reference electrode and a Pt-wire counter electrode, using a three components cell and aqueous KCl 0.1 mol  $L^{-1}$  as supporting electrolyte. Measurements were taken using a uAutoLab FRA/TypeIII.

From DC18 electrochemical data: [Fig. 2 and ref 1]  $E_{1/2}^{1}(red) = +0.04 \text{ V vs SHE} = -0.20 \text{ V vs SCE}$  $E_{1/2}^{2}(red) = -0.39 \text{ V vs SHE}$ 

We have considered the first reduction process to calculate LUMO levels. One can easily convert potentials from different reference electrodes.

LUMO = 
$$E_{1/2}^{1}$$
(red) + 4.4 (vs SCE) [ref 2]  
LUMO = -4.2 eV

HOMO levels were calculated using LUMO energies and the calculated optical band-gap.

HOMO = LUMO -  $E_g(opt)$ HOMO = -7.3 eV



**Figure 3:** A) Current density (closed symbols) and luminance intensity (open symbols) for a MEH PPV PLED incorporating BCP ( $\blacktriangle$ ) and DC18 ( $\bullet$ ). B) Luminance efficiency (closed symbols) and EQE (open symbols) for the same devices.