Supporting Information

Title: **Randomly nano-structured scattering layer as an internal light-extracting layer for transparent organic light emitting diodes**

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Determination of electron transport layer (ETL) thickness

The simulations have been performed to modulate the thickness of hole transport layer (HTL) and electron transport layer (ETL) for high total efficiency in the structure of the TOLED with the RSL using an OLED optical simulator, SimOLED[1-2]. In order to obtain realistic simulation results, we used all measured optical constants (n, k) of organic materials, which were measured using an ellipsometer (M-2000D,J.A. Woollam Co.). In this course, the HTL and the ETL were varied from 0nm to 160nm, respectively. Figure S1 shows the simulated result of total (bottom and top) efficiency in the RSL-embedded TOLED structures. The result shows that, as the HTL varies, highest total efficiency is obtained at ETL thickness of 40 nm. Thus we choose the ETL thickness to be fixed as 40 nm.

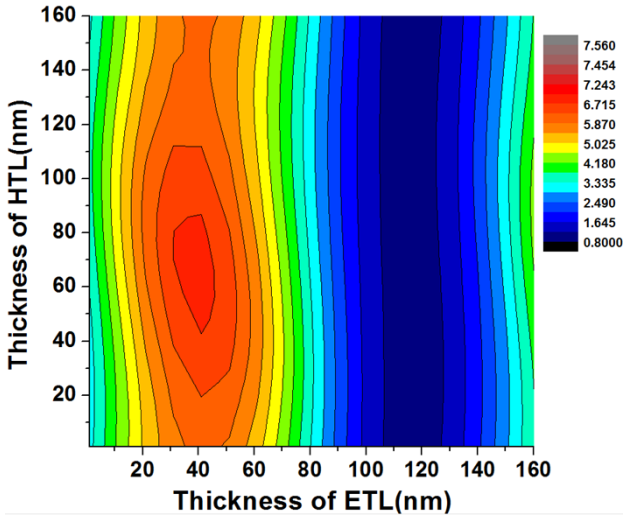

Figure S1. Contour plot of total (bottom and top) radiance of TOLEDs with the RSL depending on HTL and ETL thickness

[1] K.A. Neyts, J. Opt. Soc. Am. A., 1998, **15**, 962-971.

[2] M. Furno, R. Meerheim, M. Thomschke, S. Hofmann, B. Lussem, K. Leo, Proc. of SPIE., 2010, **7617**, 761716/1-761716/12.