

計畫名稱: 具量產價值有機藍光主客體材料及元件之開發研究(1/2)

執行單位

元智大學

計畫主持人

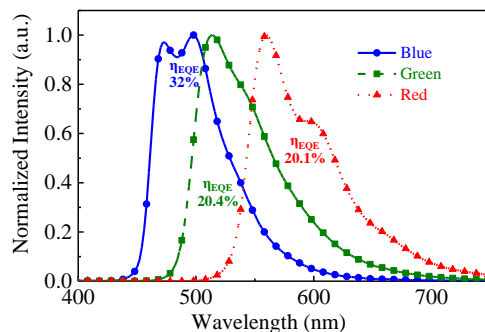
邱天隆教授

開發出具有量產價值之有機主客體材料系統，具有高發光效率及長壽命之特性，可應用於有機發光二極體 (OLED) 顯示器裝置及次世代OLED照明裝置。

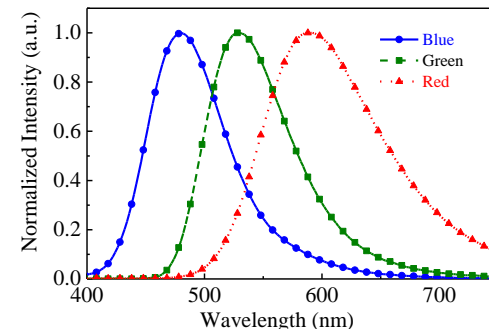
✓ 106年度申請專利共計5件。(中華民國2件、美國3件)

項次	專利申請號	申請日	專利獲准號	獲准日
1	15/413,979	2017/1/24	na	na
2	15/411,685	201701/20	na	na
3	107101286	2018/1/12	na	na
4	106142208	2017/12/1	na	na
5	15/801,822	2017/11/2	na	na

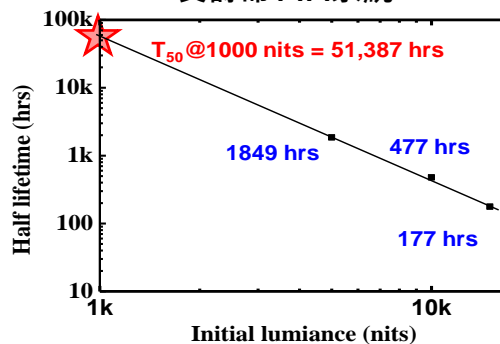
高效率磷光系統



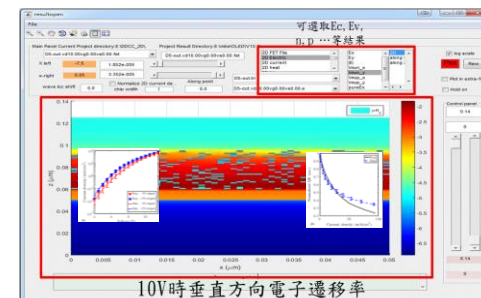
高效率TADF系統



長壽命TTA系統



OLED 模擬軟體



目前OLED 產業尚缺最後一塊拼圖，為高效率、長壽命之藍光及深藍光OLED，相關材料仍待開發驗證中，為使藍光材料得以達到市場實用性，本團隊已投注多年的人力、物力及努力等資源，針對材料特性改善、材料化學物理、元件物理、元件效率提升及壽命延長等研究方向，進行一系列的深入研究，目前已有突破性成果與發現，藍色磷光系統可達32.5%EQE；藍色TADF系統可達30.1%EQE；深藍光TTA系統可達10%EQE及LT50 可達50,000 小時以上；並開發出一套可同時考慮穩態與暫態光電特性表現之OLED 專屬的數值模擬軟體，期能加速我國在OLED 節能顯示及照明產業的發展。

Project Name: High efficiency and long lifetime organic compounds applied for organic light emitting diodes

Execution Unit

Yuan Ze University

Project Director

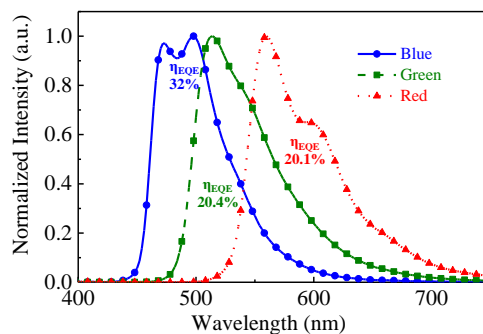
Professor Tien-Lung Chiu, Ph.D.

Several new commercial compounds to achieve the high efficiency and long lifetime organic light emitting diodes (OLED), applied for OLED displays and OLED lighting.

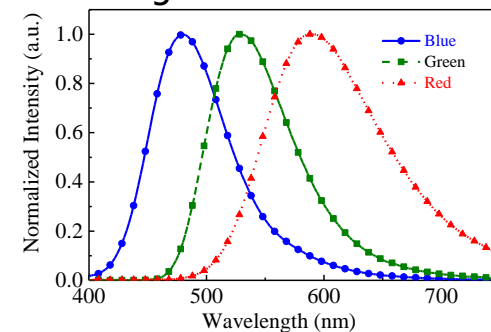
✓ 5 patent applications, including 2 Taiwan and 3 USA.

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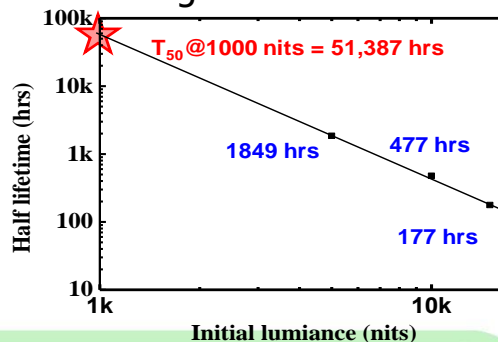
High eff. PhOLED



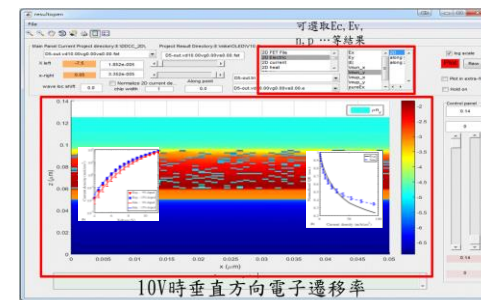
High eff. TADF-OLED



Long lifetime TTA-OLED



OLED Simulation Software



Currently, the OLED industry still lacks the last piece of puzzle in the high efficiency and long lifetime blue and deep blue OLED materials and devices. A lot of efforts were working on this, including us. We did accumulate a lot of knowledge and experiences in developing the new OLED materials to obtain high efficiency and reliability OLED. Right now, we had achieved the high efficiency blue phosphorescent OLED with an over 32.5%EQE, high efficiency blue TADF OLED with an over 30.1%EQE, high efficiency deep blue TTA OLED with 10%EQE and long lifetime LT50 over 50,000 hours. In addition, an unique OLED software for simulating device JV behavior and exciton distribution was also developed.