

Curriculum Vitae

Personal Details

Name : FUNG Man Keung, Roy (冯敏强)
Nationality : Chinese Hong Kong
Email : mkfung@suda.edu.cn
Present Position : Professor, Macao Institute of Materials Science and Engineering, Macau University of Science and Technology

Education

1999 – 2003 **Ph.D. in Materials Science**
City University of Hong Kong, Hong Kong
Advisor: Prof. Shuit-Tong Lee

1997 – 1999 **M.Phil. in Materials Science**
City University of Hong Kong, Hong Kong
Advisor: Prof. Shuit-Tong Lee

1994 – 1997 **B.Sc. in Materials Technology (1st Class Honor)**
City University of Hong Kong, Hong Kong

Professional Experience

1/2021 – present **Professor**
Macao Institute of Materials Science and Engineering, Macau University of Science and Technology

1/2014 – 12/2020 **Professor**
Institute of Functional Nano & Soft Materials (FUNSOM), & College of Nano Science & Technology, Soochow University, Suzhou, China

7/2003 – 12/2013 **Senior Research Fellow (8/2009 – 12/2013)**
Research Fellow (7/2004 – 7/2009)
Senior Research Assistant (7/2003 – 6/2004)
COSDAF & Department of Physics & Materials Science, City University of Hong Kong

Research Interests

Organic Light-Emitting Diode (OLED) for Display and Lighting; Flexible OLED and its Thin Film Encapsulation; Perovskite LED; Semiconductor Surfaces and Interfaces.

Honors and awards

2018 The Top Ten Innovative Pioneer in Suzhou (person award)
2017 The Six Major Talents Summit of Jiangsu Province (personal award)
2016 Science and Technology Leadership Award in Wujiang Suzhou (team award)
2016 High-Level Innovation & Entrepreneurship Talents of Jiangsu Province (team award)
2015 High-level Talents in Colleges and Universities of Suzhou (personal award)

Research Experience and Accomplishments:

Prof. Fung has over 15 years of fundamental, applied research and industrial research experiences on OLED display ranging from low-resolution PMOLED to ultra-high-resolution micro-display, OLED lighting such as general lighting, automobile lighting and phototherapy lighting, light extraction techniques for OLED, advanced thin films for the encapsulation of flexible OLED, mechanism studies on perovskite LED, surface and interface studies of organic semiconductors, etc.

Prof. Fung has published over 120 peer-reviewed SCI papers and 3 book chapters with more than 4000 citations and H-index of 35 (Scopus) / 38 (GS). Filed over 50 patents (with 29 patents granted). Delivered more than 20 invited talks and lectures in international conferences and workshops. Since 2017, Prof. Fung has been the Organizing Committee of International Conference on Display Technology (2017-2020) and the Committee Member of the Society for Information Display (Beijing Chapter). Besides, Prof. Fung has been a PI or key co-investigator of over 20 projects related to organic electronics and nanotechnology. Major research grants in recent include:

1. Key Technologies for High-Efficiency and Large-Area OLED Lighting and the Manufacturing of an OLED Production Line, funded by the Ministry of Science and Technology (MOST) of China, 7/2016 – 6/2020, 30 Millions RMB (as a co-PI of a sub-topic ‘Key Technologies for Large-Area OLED Lighting’, 7.5 Millions RMB).
2. Smart OLED Lighting, PI, funded by the National Natural Science Foundation of China, 1/2015 – 12/2018, 820K RMB.
3. Investigation of Highly Efficient and Stable Exciplex-based White Organic Light Emitting Diodes and their Mechanism Studies, PI, funded by the National Natural Science Foundation of China, 1/2019 – 12/2022, 620K RMB.
4. Micro OLED Display for VR/AR Applications, funded by the Jiangsu Province, 6/2018 – 9/2021, 5.99 Millions RMB (as a co-PI of a sub-topic ‘High Brightness Silicon-based OLED Display’, 1.99 Millions RMB).

Selected Publications (2016-2020):

Perovskite LEDs and Photovoltaics:

- [1] Q.W. Liu, S. Liu, S.Q. Sun, W. Luo, Y.J. Zhang, L.S. Liao, **M.K. Fung***, Interfacial engineering for highly efficient quasi-two dimensional organic–inorganic hybrid perovskite light-emitting diodes, *J. Mater. Chem. C*, 2019, DOI: 10.1039/c8tc06490c.
- [2] S.Q. Sun, X.C. Hua, Q.W. Liu, T.T. Wang, W. Luo, Y.J. Zhang, L.S. Liao, **M.K. Fung***, Influence of a lecithin additive on the performance of all-inorganic perovskite light-emitting diodes, *J. Mater. Chem. C.*, 2019, 7, 2905-2910.
- [3] D.Y. Liu, Y. Li, J.Y. Yuan*, Q.M. Hong, G.Z. Shi, D.X. Yuan, J. Wei, C.C. Huang, J.X. Tang and **M.K. Fung***, Improved performance of inverted planar perovskite solar cells with F4-TCNQ doped PEDOT:PSS hole transport layers, *J. Mater. Chem. A.*, 2017, 5, 5701-5708.

OLED Devices:

- [4] C.C. Huang, Y.J. Zhang, J.G. Zhou, S.Q. Sun, W. Luo, W. He, J.N. Wang, X.B. Shi, **M.K. Fung***, Hybrid Tandem White OLED with Long Lifetime and 150 Lm W–

- 1 in Luminous Efficacy Based on TADF Blue Emitter Stabilized with Phosphorescent Red Emitter, *Advanced Optical Materials*, 2000727, 2020.
- [5] W. Luo, T.T. Wang, X. Chen, K.N. Tong, W. He, S.Q. Sun, Y.J. Zhang, L.S. Liao, **M.K. Fung***, High-performance organic light-emitting diodes with natural white emission based on thermally activated delayed fluorescence emitters, *Journal of Materials Chemistry C*, 8, 10431-10437, 2020.
- [6] W. Luo, X. Chen, S.Q. Sun, Y.J. Zhang, T.T. Wang, L.S. Liao, **M.K. Fung***, Management of Exciton for Highly-Efficient Hybrid White Organic Light-Emitting Diodes with a Non-Doped Blue Emissive Layer, *Molecules*, 24, 4046, 2019.
- [7] J.G. Zhou X.C. Hua, Y.K. Chen, Y.Y. Ma, C.C. Huang, Y.D. Wang, **M.K. Fung***, Nano-modified indium tin oxide incorporated with ideal microlens array for light extraction of OLED, *J. Mater. Chem. C* 2019, 7, 3958-3964.
- [8] Y.Y. Ma, X.C. Hua, T.S. Zhai, Y.H. Li, X. Lu, S. Duhm, **M.K. Fung***, “Doped copper phthalocyanine via an aqueous solution process for high-performance organic light-emitting diodes”, *Org. Electronics*, 2019, 68, 236-241.
- [9] J.G. Zhou, X.C. Hua, C.C. Huang, Q. Sun, **M.K. Fung***, Ideal microlens array based on polystyrene microspheres for light extraction in organic light-emitting diodes, *Org. Electronics* 2019, 69, 348-353.
- [10] T. Xu, Y.X. Zhang, C.C. Huang, J.G. Zhou, **M.K. Fung** and H. Meng*, Highly simplified blue phosphorescent organic light-emitting diodes incorporating exciplex-forming co-host assisting energy transfer, *J. Lumin* 2019, 206, 554-559.
- [11] C.C. Huang, M.M. Xue, F.P. Wu, Y. Yuan, L.S. Liao* and **M.K. Fung***, Deep-Blue and Hybrid-White Organic Light Emitting Diodes Based on a Twisting Carbazole-Benzofuro[2,3-b]Pyrazine Fluorescent Emitter, *Molecules* 2019, DOI: 10.3390/molecules24020353.
- [12] Y.M. Xie, Q. Sun, T. Zhu, L.S. Cui, F. Liang, S.W. Tsang, **M.K. Fung***, and L.S. Liao*, Solution processable small molecule based organic light-emitting devices prepared by dip-coating method, *Org. Electronics*, 2018, 55, 1-5.
- [13] S.H. Li, S.F. Wu, Y.K. Wang, J.J. Liang, Q. Sun, C.C. Huang, J.C. Wu, L.S. Liao and **M.K. Fung***, Management of excitons for highly efficient organic light-emitting diodes with reduced triplet exciton quenching: synergistic effects of exciplex and quantum well structure, *J. Mater. Chem. C.*, 2018, 6, 342-349.
- [14] X. Lu, G.J. Liu, Y.H. Li, Y.Y. Ma, J. Fan and **M.K. Fung***, Smart OLED Lighting on Electrochromic Glass, *Phys. Status. Solidi. A* 2018, 215, 1800102-1800108.
- [15] T. Xu*, J.G. Zhou, **M.K. Fung** and H. Meng*, Simplified efficient warm white tandem organic light-emitting devices by ultrathin emitters using energy transfer from exciplexes, *Org. Electronics* 2018, 63, 369-375.
- [16] S.F. Wu, S.H. Li, Y.K. Wang, C.C. Huang, Q. Sun, J.J. Liang, L.S. Liao, **M.K. Fung***, White Organic LED with a Luminous Efficacy Exceeding 100 lm W-1 without Light Out-Coupling Enhancement Techniques, *Adv. Funct. Mater.*, 2017, 27, 1701314-1701322.
- [17] Y.H. Li, X. Lu, R.B. Wang, Y.Y. Ma, S. Duhm, **M.K. Fung***, Cu-Doped nickel oxide prepared using a low-temperature combustion method as a hole-injection layer for high-performance OLEDs, *J. Mater. Chem. C.*, 2017, 5, 11751-11757.
- [18] C.C. Huang, Y.M. Xie, .F. Wu, S.H. Li, J.J. Liang, **M.K. Fung***, Thermally activated delayed fluorescence-based tandem OLEDs with very high external quantum efficiency, *Phys. Status. Solidi. A* 2017, 214, 1700240-1700245.
- [19] T. Xu, J.G. Zhou, C.C. Huang, L. Zhang, **M.K. Fung**, I. Murtaza, H. Meng*, L.S. Liao*, Highly Simplified Tandem Organic Light-Emitting Devices Incorporating a

Green Phosphorescence Ultrathin Emitter within a Novel Interface Exciplex for High Efficiency, *ACS Appl. Mater. & Inter.* 2017, 9, 10855-10962.

[20] Q. Sun, L.S. Cui, Y.M. Xie, J.J. Liang, Z.Q. Jiang, L.S. Liao*, **M.K. Fung***, Aminoborane-based bipolar host material for blue and white-emitting electrophosphorescence devices, *Org. Electronics*, 2017, 48, 112-117.

[21] **M.K. Fung**, Y.Q. Li, L.S. Liao*, Tandem Organic Light-Emitting Diodes, *Adv. Mater.*, 2016, 28, 10381-10408.

[22] S.F. Wu, S.H. Li, Q. Sun, C.C. Huang, **M.K. Fung***, Highly Efficient White Organic Light-Emitting Diodes with Ultrathin Emissive Layers and a Spacer-Free Structure, *Sci. Rep-UK.*, 2016, 6.

[23] Huai-Xin Wei, Feng-ShuoZu, Yan-Qing Li, Wen-Cheng Chen, Yi Yuan, Jian-Xin Tang*, **Man-Keung Fung**, Chun-Sing Lee* and Yong-Young Noh*, Charge transport dependent high open circuit voltage tandem organic photovoltaic cells with low temperature deposited HATCN-based charge recombination layers, *Phys. Chem. Chem. Phys.* 2016, 18, 4045-4050.

OLED Materials:

[24] A. Khan, X. Xing; S. Kumar, S.Y. Yang, Y.J. Yu, W. Luo, Z.Q. Jiang, **M.K. Fung***, L.S. Liao, Spiro-Type Host Materials with Rigidified Skeleton for RGB Phosphorescent OLEDs, *Journal of Materials Chemistry C*, 8, 12470, 2020.

[25] S.N. Liu, K.N. Tong, Y. Zhao, J.F. Cheng, **M.K. Fung***, J. Fan*, Efficient red phosphorescent Ir (iii) complexes based on rigid ligands with high external quantum efficiency and low efficiency roll-off, *Journal of Materials Chemistry C*, 8, 6168, 2020.

[26] Y.K. Wang, C.C. Huang, H. Ye, C. Zhong, A. Khan, S.Y. Yang, **M.K. Fung**, Z.Q. Jiang*, C. Adachi*, L.S. Liao, Through Space Charge Transfer for Efficient Sky-Blue Thermally Activated Delayed Fluorescence (TADF) Emitter with Unconjugated Connection, *Advanced Optical Materials*, 8, 1901150, 2020.

[27] A. Khan, Y.K. Wang, C.C. Huang, S. Kumar, **M.K. Fung**, Z.Q. Jiang*, L.S. Liao*, Donor-spiro-acceptor architecture for green thermally activated delayed fluorescence (TADF) emitter, *Organic Electronics*, 77, 105520, 2020.

[28] Y.Y. Hu, W. Luo, C.G. Hu, Y. Wang, B.H. Tong, **M.K. Fung***, Y.P. Tian, Q.F. Zhang, The one-pot synthesis of homoleptic phenylphthalazine iridium (III) complexes and their application in high efficiency OLEDs, *Journal of Luminescence*, 219, 116846, 2020.

[29] S. Kumar, Y.Y. Ma, A. Khan, Y. Yuan, S.Y. Yang, Z.Q. Jiang*, **M.K. Fung**, L.S. Liao*, Structurally controlled singlet-triplet splitting for blue star-shaped thermally activated delayed fluorescence emitters incorporating the tricarbazoles-triazine motifs, *Organic Electronics*, 105783, 2020.

[30] T.T. Wang, W. Luo, H.C. Li, S.Q. Sun, X.D. Zhu, A. Khan, **M.K. Fung***, L.S. Liao, Z.Q. Jiang*, Design and Synthesis of Donor- σ - π - σ -Acceptor-Type Dispiro Molecules, *Organic letters*, 21, 13, 5281-5284, 2019.

[31] X.Y. Liu, Y.J. Zhang, X. Fei, **M.K. Fung***, J. Fan*, Four-Coordinate Organoboron Platforms for Efficient Red Phosphorescent Organic Light-Emitting Diodes, *ChemPlusChem*, 84, 1587-1595, 2019.

[32] Ya-Kun Wang, Chen-Chao Huang, Sarvendra Kumar, Sheng-Fan Wu, Yi Yuan, Aziz Khan, Zuo-Quan Jiang*, **Man-Keung Fung**, Liang-Sheng Liao*, The roles of thermally activated delayed fluorescence sensitizers for efficient red fluorescent organic light-emitting diodes with D-A-A type emitters, *Mater. Chem. Front.* 2019, 3, 161-167.

- [33] Q. Ran, Y.L. Zhang, X.C. Hua, **M.K. Fung**, L.S. Liao* and J. Fan*, Modulation of p-type units in tripodal bipolar hosts towards highly efficient red phosphorescent OLEDs, *Dyes Pigments* 2019, 162, 632-639.
- [34] X.Y. Liu, Y.J. Zhang, X.Y. Fei, Q. Ran, **M.K. Fung*** and J. Fan*, Diazaspirocycles: novel platforms for efficient phosphorescent organic light-emitting diodes, *J. Mater. Chem. C.*, 2019, 7, 1370-1378.
- [35] Xiyu Fei, Yi-Jie Zhang, Xiang-Yang Liu, **Man-Keung Fung***, Jian Fan*, A series of fluorenone-carbazole based regioisomers as bipolar host materials for efficient organic light emitting diodes, *Tetrahedron*, 2019, 75, 2664-2669.
- [36] X.Y. Liu, Y.J. Zhang, X.Y. Fei, **M.K. Fung*** and J. Fan*, Dispirocycles: Novel Platforms for Construction of High-Performance Host Materials for Phosphorescent Organic Light-Emitting Diodes, *Chem-Eur J.*, 2019, DOI:10.1002/chem.201806207.
- [37] M. Li, S.H. Li, D.D. Zhang, M.H. Cai, L. Duan, **M.K. Fung***, and C.F. Chen*, Stable Enantiomers Displaying Thermally Activated Delayed Fluorescence: Efficient OLEDs with Circularly Polarized Electroluminescence, *Angew. Chem. Int. Edit.*, 2018, 57, 2889-2893.
- [38] D. L. Zhao, C.C. Huang, X.Y. Liu, B. Song, L. Ding, **M.K. Fung*** and J. Fan*, Efficient OLEDs with saturated yellow and red emission based on rigid tetradentate Pt(II) complexes, *Org. Electronics*, 2018, 62, 542-547.
- [39] Y. K. Wang, C.C. Huang, S. Kumar, S.H. Li, Z.L. Dong, **M.K. Fung***, Z.Q. Jiang* and L.S. Liao, Thermally activated delayed fluorescence sensitizer for D-A-A type emitters with orange-red light emission, *J. Mater. Chem. C.*, 2018, 6, 10030-10035.
- [40] X.Y. Liu, Y.Y. Ma, W.J. Zhang, B. Song, L. Ding, **M.K. Fung*** and J. Fan*, A Novel Linking Strategy of Using 9,10-Dihydroacridine to Construct Efficient Host Materials for Red Phosphorescent Organic Light-Emitting Diodes, *Chem-Eur J.*, 2018, 24, 11755-11762.
- [41] W.K. Hu, S.H. Li, X.F. Ma, S.X. Zhou, Q.F. Zhang, J.Y. Xu, P. Shi, B.H. Tong*, **M.K. Fung***, and L.S. Fu*, Blue-to-green electrophosphorescence from iridium(III) complexes with cyclometalated pyrimidine ligands, *Dyes Pigments*, 2018, 150, 284-292.
- [42] J. Li, Y.H. Li, Y. Zhao, X.Y. Liu, **M.K. Fung*** and J. Fan*, Naphthalene-based host materials for highly efficient red phosphorescent OLEDs at low doping ratios, *Org. Electronics*, 2018, 54, 140-147.
- [43] Y. Li, J.J. Liang, H.C. Li, L.S. Cui, **M.K. Fung**, S. Barlow, S.R. Marder*, C. Adachi, Z.Q. Jiang*, L.S. Liao, The role of fluorine-substitution on the -bridge in constructing effective thermally activated delayed fluorescence molecules, *J. Mater. Chem. C* 2018, 6, 5536-5541.
- [44] Y.K. Wang, S.H. Li, S.F. Wu, C.C. Huang, S. Kumar, Z.Q. Jiang*, **M.K. Fung**, and L.S. Liao, Tilted Spiro-Type Thermally Activated Delayed Fluorescence Host for approximate to 100% Exciton Harvesting in Red Phosphorescent Electronics with Ultralow Doping Ratio, *Adv. Funct. Mater.* 2018, 28, 1706228-1706227.
- [45] J.J. Liang, Y. Li, Y. Yuan, S.H. Li, X.D. Zhu, S. Barlow, **M.K. Fung***, Z. Q. Jiang, S.R. Marder* and L.S. Liao, A blue thermally activated delayed fluorescence emitter developed by appending a fluorene moiety to a carbazole donor with meta-linkage for high-efficiency OLEDs, *Mater. Chem. Front.* 2018, 2, 917-922.
- [46] M.M. Xue, C.C. Huang, Y. Yuan, Y.X. Zhang, **M.K. Fung*** and L.S. Liao*, A novel electron-acceptor moiety as a building block for efficient donor-acceptor based fluorescent organic lighting-emitting diodes, *Chem. Commun.*, 2017, 53, 263-265.
- [47] Y.K. Wang, S.F. Wu, S.H. Li, Y. Yuan, F.P. Wu, S. Kumar, Z.Q. Jiang*, **M.K.**

Fung, and L.S. Liao*, D-A-A-Type Emitter Featuring Benzo[c][1,2,5]thiadiazole and Polar CN Bond as Tandem Acceptor for High-Performance Near-Infrared Organic Light-Emitting Diodes, *Adv. Opt. Mater.* 2017, 5, 1700566.

[48] Y.K. Wang, S.F. Wu, Y. Yuan, S.H. Li, **M.K. Fung**, L.S. Liao* and Z.Q. Jiang*, Donor-sigma-Acceptor Molecules for Green Thermally Activated Delayed Fluorescence by Spatially Approaching Spiro Conformation, *Org. Lett.* 2017, 19, 3155-3158.

[49] M.M. Xue, C.C. Huang, Y. Yuan, L.S. Cui, Y.X. Li, B. Wang, Z.Q. Jiang*, **M.K. Fung***, L.S. Liao*, De Novo Design of Boron-Based Host Materials for Highly Efficient Blue and White Phosphorescent OLEDs with Low Efficiency Roll-Off, *ACS Appl. Mater. & Inter.*, 2016, 8, 20230-20236.

[50] Y.K. Wang, Q. Sun, S.F. Wu, Y. Yuan, Q. Li, Z.Q. Jiang*, **M.K. Fung** and L.S. Liao*, Thermally Activated Delayed Fluorescence Material as Host with Novel Spiro-Based Skeleton for High Power Efficiency and Low Roll-Off Blue and White Phosphorescent Devices, *Adv. Funct. Mater.* 2016, 26, 7929-7936.