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Orthogonal Photolithography as transformative patterning technique for Organic Electronics and Photonics ALEX ZAKHIDOV, Texas State University — Orthogonal photolithography (OP) takes advantage of the fact that the vast majority of organic semiconducting materials are either oleophilic or hydrophilic and are hence orthogonal to highly fluorinated chemicals. Therefore, appropriate fluorinated photoresists can be used to pattern organic layers without compromising performance of organic device. The availability of such orthogonal photoresists promises to enable the fabrication of complex device structures, expanding the range of possibilities for organic electronics. Particular, OP technique enables sub-pixel high-resolution patterning for OLED displays [1]. Once RGB sub-pixel structuring is realized it is expected to improve (up to 10 times) the efficiency of a display. Moreover, processing solvents used for OP can be used as encapsulation media to improve heat management of high brightness OLED devices [2]. Other applications of OP include ultra-small channel OTFTs [3], OTFT based circuits and high voltage failure/proof organic solar cells.

[1] S. Krotkus et al, Adv. Opt. Mat. DOI: 10.1002/adom.201400181 (2014).
[2] A.A. Zakhidov et al, Organic Electronics 13, 356 (2012).
[3] A.A. Zakhidov et al, Chem. Sci., 2, 1178 (2011).

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