

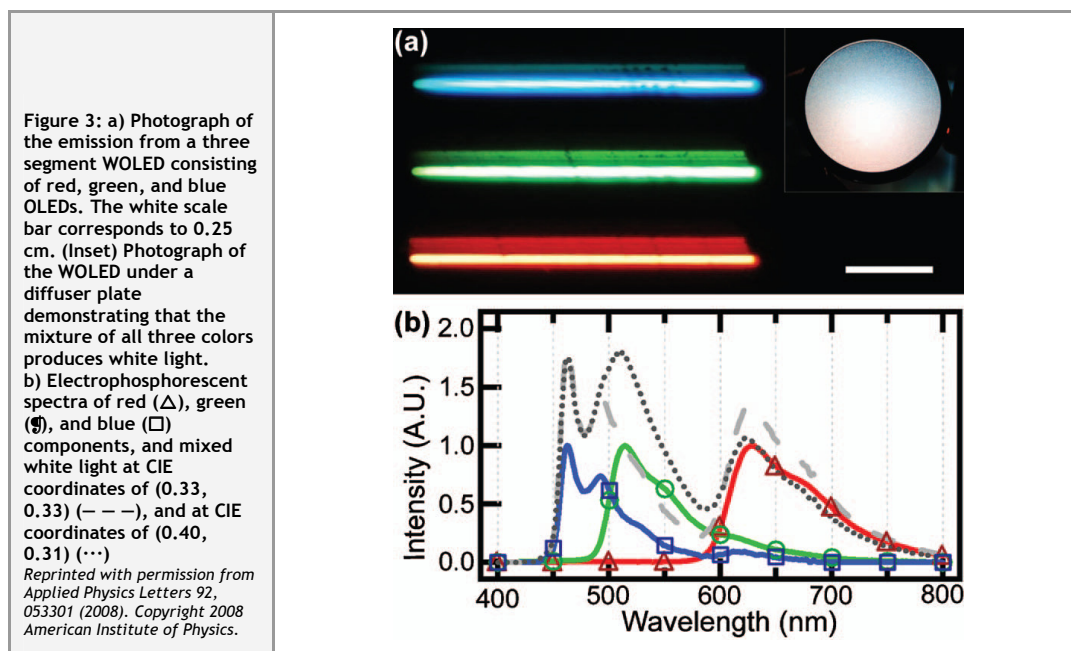
## Univ. of Michigan & Univ. of Stanford: Organic vapour jet printing (OVJP)

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White OLEDs by OVJP  
(Organic Vapour Jet Printing)



A team from the **University of Michigan** & the **University of Princeton** describes Organic-vapor jet printing OVJP for directly patterning of small molecular weight electrophosphorescent white organic light-emitting devices (WOLEDs) consisting of parallel stripes of separate red, green, and blue OLEDs. The device is composed of Ir-based phosphorescent dopants and with two host materials, 1-3-bis(carbazol-9-yl)benzene (mCP) and 4-4'-bis(carbazol-9-yl)biphenyl (CBP). The use of multiple color segments to generate white light allows the individual optimisation of each color, is continuously color tunable, and can be used to compensate for differential aging of the constituent dopants.



The novelty of the proposed approach is to eliminate the solvent completely. In OVJP, the organic source is heated to produce a vapour, which is then transported to a small heated nozzle, where it is collimated to allow controlled deposition on a cooled substrate. By vaporizing the organic source, the problems of solvent compatibility, solubility, surface tension, and drop size are avoided. Moreover, any pattern can be generated without the use of a mask.

Organic vapour jet printing (OVJP) provides a simple and efficient means of patterning parallel stripes of red, blue, and green electrophosphorescent OLEDs down to a resolution of 10  $\mu\text{m}$ . It is a relatively fast method, estimations show that 10cmx10 cm WOLED could be printed in 1.5 s.

However further improvement of the process should be made (e.g. choice of dopants, using multiple nozzles etc.)

"Direct vapor jet printing of three color segment organic light emitting devices for white light illumination"; M.S. Arnold, G.J. McGraw, S.R. Forrest, R.R. Lunt : *Applied Physics Letters* 92, 053301 (2008).