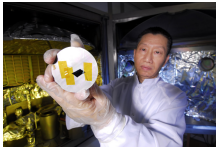


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By: Gabriel Gache, Science News Editor



Wusheng Tong displaying his silicon oxynitride coated OLED device
Gary Meek

New Seal Makes OLEDs Moisture-free

OLED sealing method promises longer lasting, cheaper displays

Organic light emitting diodes, or OLEDs for short, are now viewed as the future of solid state displays, mostly because they are easy to manufacture and much more efficient at converting electric energy into light. Nevertheless, the OLED design is flawed by the fact that they are very susceptible to moisture, which interacts with the organic material and destroys the OLEDs. Georgia Tech Institute Researcher Wusheng Tong claims to have found a solution to minimize moisture intrusion in order to expand OLED applications lifetime. "OLEDs have better color and flexibility and the capability of larger displays, but companies still need an inexpensive encapsulating method that can be used to mass produce organic electronics that don't allow moisture in," writes Tong. The technique currently used in sealing OLED from the action of moisture involves creating an inert or vacuumed medium containing absorbent powders, which is very labor-intensive and expensive at the same time. The method used by Tong disables the use of glass lids to contain the inert medium and replaces it with an inexpensive film barrier. "We chose a passivation coating process that could be performed at room temperature so that the organic material remained intact. Ideally, the film should be as thin as possible, but if it's too thin, a pinhole or other defect could appear and cause a problem. We found that a film of 50-200 nanometer thickness was perfect," says Tong. The film is made out of silicon oxynitride material, deposited through an ion assisted method in order to ensure a high-density structure. Experiments revealed that the encapsulation technique developed by Tong is at least 14 times more efficient in comparison with non-protected OLED devices. The testing was conducted in open air conditions, at temperatures of 50 degrees Celsius and relative humidity of 50 percent. "We've demonstrated that this deposition process improves the lifetime of the OLEDs by blocking the intrusion of moisture, so now we're hoping to work with industry partners to develop a mass production process for our encapsulation technique," said Tong.