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News & Analysis

GaN LEDs: Sputtering Cuts Costs on Larger Displays

Paul Buckley, EE Times Europe

6/25/2014 10:55 AM EDT

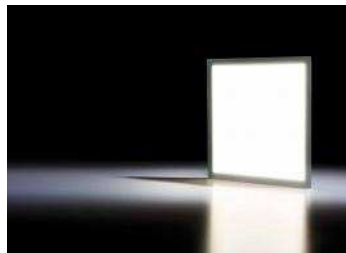
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A team of University of Tokyo researchers in Japan has developed a technology for creating GaN LEDs on glass substrate, which could not only cut manufacturing costs but also help to develop OLED light panels.

The researchers use a sputtering method to transcribe the GaN LEDs onto the glass substrate. The team has not yet measured luminous efficiency or external quantum efficiency for any single color but is currently testing the efficiency of the internal quantum at low temperatures.



InGaN-based light-emitting diodes (LEDs) have been widely accepted as highly efficient light sources capable of replacing incandescent bulbs but applications of InGaN LEDs are limited to small devices because their fabrication process involves expensive epitaxial growth of InGaN by metalorganic vapor phase epitaxy on single-crystal wafers.

The researchers have used a low-cost epitaxial growth process, such as sputtering on large-area substrates, to fabricate large-area InGaN light-emitting displays.

By using multilayer graphene buffer layers the growth of highly c-axis-oriented GaN films even on amorphous substrates was feasible. The research team fabricated red, green, and blue InGaN LEDs and confirmed their successful operation.

The researchers believe that by demonstrating that full-color LEDs can be fabricated on amorphous substrates and sputtering is frequently used in the LCD industry so a process could be adapted to fabricate large-area inorganic LED displays on glass substrates.

The researchers point out that state-of-the-art technology in the glass industry can offer roll-to-roll processing of flexible glass foils and a combination of these techniques can lead to the development of large-area flexible inorganic devices.

Article originally published on EE Times' sister site, [EE Times Europe](#).

Based on "[Fabrication of full-color InGaN-based light-emitting diodes on amorphous substrates by pulsed sputtering](#)"

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JeffL_2 I'm not sure why Applied Micro is even considered a "primary source" for PPC anymore, try and buy some actual parts through distribution and practically all you can actually get...

6/26/2014
11:57:43 AM



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Estimated cost
chanj0 6/26/2014 1:44:26 AM

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The technology sounds promising. Question is how much compared to the current cost of OLED. Another challenge is the life time of the glass.

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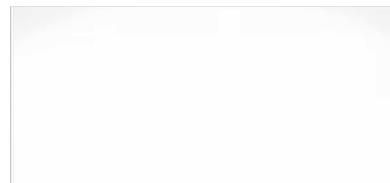
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LED not OLED
tfungus 6/25/2014 1:45:16 PM

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"creating GaN LEDs on glass substrate, which could not only cut manufacturing costs but also help to develop OLED light panels." Author should edit this since GaN is inherently NOT OLED. This paper only demonstrated GaN LED on a silicon wafer with an SiO2 layer. Nice academic paper but the prospects of fabrication on organic substrate is just another academic buzzword funding pitch.

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Are these embedded systems? Check all that apply and add other yes/no/maybe examples as comments:

- Blade Server
- Dishwasher
- Microwave Oven
- Modern Automobile
- Oscilloscope (with Windows OS)
- Set-Top Box (with Linux OS)
- Smartcamera (with WiFi)
- Smartphone
- Smartwatch
- Tablet Computer

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Warren3 on [Patient, Heal ...](#)



Re: Worth the Read: @Warren3, I completely agree. This is a good read: Engineers at Boston Scientific -- and all engineers -- should feel proud they're doing...

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Hover board: @Max...a practical and achievable DIY strategy might be to aim between the two. Use the leaf blower (or two or even 4 of them) and use...

David Ashton on [Hover Board \(I Can ...](#)

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