

MicroLED on Flexible Substrate

Background

While MicroLEDs have superior display properties when compared to LCD or OLED, the cost to implement the display media onto the backplane is very expensive and hence their applications has been limited to use in small screen size displays (i.e. smart phones).

Description of the invention

Researchers at the University of Waterloo have created a novel pixel circuit and fabrication method of reliably implementing microLEDs together with novel thin-film transistor pixel circuits onto flexible substrates. A prototype of a flexible integrated thin-film transistor (TFT)-based pixel circuit and microLED display media has been demonstrated using methods from several UW patent pending technologies.

Advantages

This technology enables the creation of large-area flexible and conventional rigid displays that utilize high-brightness, energy-efficient microLEDs. A novel pixel circuit is able to compensate induced current degradation in the pixel circuit due to operational aging and mechanical bending. The novel design and integration process enables stable light intensity for extended operating lifetimes while the display is under mechanical bending. The circuit has been demonstrated and initial measurement results demonstrate the efficacy of the design and fabrication process compared to conventional pixel circuits for OLED displays. In addition, the technology takes advantage of existing amorphous silicon TFT technology that leverages a mature and developed pathway for commercialization.

Potential applications

This technology allows microLEDs to be used in applications never before were possible:

- Large screen displays (*i.e.* televisions and outdoor signage)
- Inexpensive flexible electronics for applications in portable consumer electronics such as smart phones, tablets, solid-state lighting.
- Enhanced functionality for conformal displays and sensors for using in the health care sector, water purification, and IoT applications.

Reference

8810- 10149

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Patent status

Provisional patent application filed
PCT patent application filed

Stage of development

Prototype
Ongoing research

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