Sony shows flex twist on organic LED displays

By Yoshiko Hara

TOKYO — Sony Corp. has developed what it says is the first full-color active-matrix organic LED display on a flexible plastic substrate.

Sony showed the prototype last Friday (May 25) at the Society for Information Display conference. (View a video here.)

In the lab, Sony engineers first developed a process for forming an organic thin-film transistor backplane on a glass substrate and then reproduced virtually the same structure on plastic film. The process temperature was less than 180° C. Sony used C22H14 pentacene material to form organic transistors with 0.1-cm²/Vs mobility.

The prototype is a 2.5-inch diagonal display with 120 x 160 pixels and 8-bit gray scales to deliver a full 16.8 million colors. Resolution is 80 pixels/inch (each pixel measures 318 x 318 microns). Each subpixel (red, green or blue) is driven by a two-transistor, one-capacitor PMOS voltage programming circuit. The display operates at a frame rate of 60 Hz with a signal voltage of 12 V.

Sony uses a top-emission structure for its OLED displays, meaning they have driving transistors on the bottom and emit light from a top OLED layer. The displays comprise layers of electrodes, organic TFTs, OLEDs and cathodes, each separated by organic insulators. The structure reportedly allowed the engineers to fabricate the electrodes before fabricating the organic TFT layer, without damaging the semiconductor layer.

Engineers continue to refine the flexible displays' performance and other specs to ready the technology for commercial launch. No target date for introduction has been set.