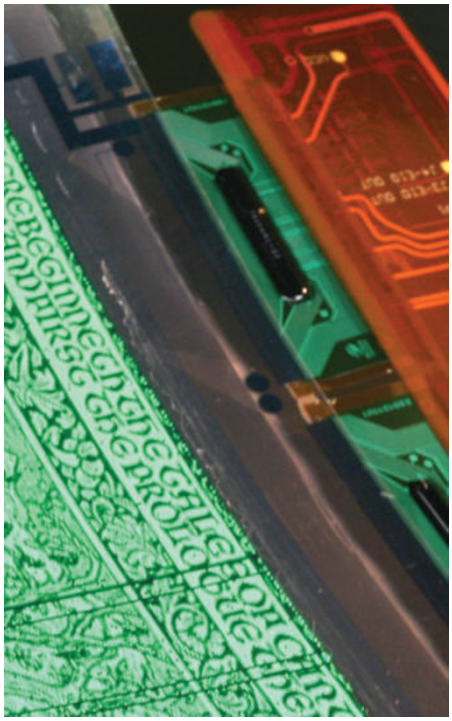

COVER IMAGE
Active-matrix OLEDs provide efficient and flexible display solutions. (Image credit: Flexible Display Center)

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The age of organics

After a long and arduous development process, lighting products and large displays based on organic light-emitting diode (OLED) technology are finally coming to market. In our product highlights on page 457, the Korean electronics giant Samsung reveals that it has now developed 14.1- and 31-inch OLED television panels that are ready for commercial production. Not only are these displays very thin but they also boast impressive brightness and colour fidelity, suggesting that they could become a feasible alternative to traditional liquid crystal displays.

It is new material technology, such as the doping schemes from Novaled (see page 444), that has helped improve the performance of small-molecule OLEDs in recent years, and polymer OLED technology is not far behind according to Cambridge Display Technology (see page 453). However, challenges in both markets remain. For example, Marc Baldo, an expert in organic photonics from Massachusetts Institute of Technology, USA, believes the efficiency of blue OLEDs could still be improved (see page 458). He also points out that one of the major challenges facing OLED displays and the lighting industry is not actually the OLED materials themselves, where huge improvements have been made to efficiencies and lifetimes; surprisingly, the problem lies with the stability of the silicon backplane electronics. Twenty years ago, when researchers worldwide were struggling to achieve reasonable lifetimes and efficiencies from OLED materials, few would have predicted that silicon technology would be the bottleneck to commercialization.

Another industry that has benefited from the advances made in OLED technology is the organic photovoltaics sector. Major improvements have been made, with efficiencies above 6% reported for the first time (see page 447). However, as with the OLED industry, and indeed any fledgling market, many challenges remain: examples include developing reliable manufacturing processes and further improving the lifetimes of these low-cost, flexible cells. However, if the progress of the last 10 years is anything to go by, these challenges may be short-lived.

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