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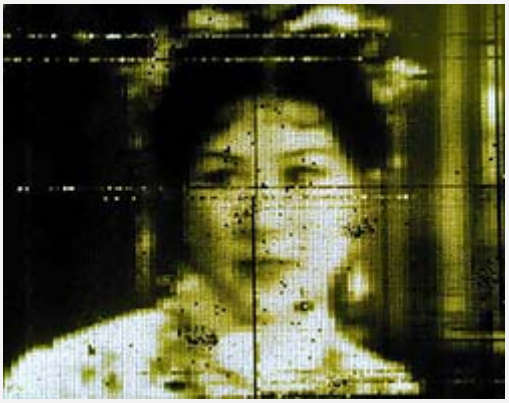
Better Vision for the Future

Scientists at the Hong Kong University of Science and Technology (HKUST) have succeeded in using low temperature polycrystalline silicon technology to develop an active matrix organic light emitting diode (OLED) display, an exciting new technology for flat panel displays.



HKUST display prototype with a moderate resolution of 80x120

OLEDs are thin films of molecules that can be induced to emit light. Heralded as the display technology for the future, OLEDs can be used in a wide range of display applications including magnified microdisplays, digital cameras, personal digital assistants (PDA), smart pagers, virtual reality games, mobile phones, car stereo displays as well as other consumer media products.

"OLED has the potential to replace liquid crystal displays (LCD) in many high end applications such as in laptops, desktop computers and even TV sets," said Prof Hoi Sing Kwok at the HKUST's Electrical and Electronic Engineering Department. "The low temperature polycrystalline silicon active matrix technology developed at HKUST is aimed at these applications," he said.

OLEDs have several major advantages over LCDs in that they provide a greater viewing angle and quicker response; they are lighter in weight and could consume less power; they are brighter and their profiles are thinner.

"OLEDs emit their own light so they don't have to be backlighted as LCDs, thus reducing energy consumption substantially and simplifying the fabrication process, "said Dr Man Wong, Associate Professor at the Electrical and Electronic Engineering Department and an expert in low temperature polycrystalline silicon TFT technology. He is collaborating with Prof Kwok on the integration of TFT and OLED technologies to produce active matrix OLED displays.

Although OLED technology is still under intense research and development, it is heading directly and rapidly for the marketplace, with Kodak as the technology leader. Other companies such as Cambridge Display Technology, Sanyo, TDK, Pioneer and Philips also have OLED development programs. Pioneer has integrated the technology in the production of car stereo displays and mobile phones.

The OLED display prototype made by HKUST is based on a small molecule OLED in monochrome color. Researchers are in the process of developing full color prototypes which promise higher resolution.

Prof Kwok and Dr Wong have applied for a patent on the low temperature polycrystalline silicon technology. They have also been collaborating with electronics manufacturers to commercialize the technology.