

## **The Sixth Green and Sustainable Chemistry Award**

Awarded by the Minister of the Environment

Seiko Epson Corporation

### *Practical use of Inkjet Technology for Forming Functional Thin-Films for Liquid Crystal Displays*

Electronic devices such as liquid crystal panels are fabricated in complicated, multi-step processes that consume huge amounts of energy. The implementation of low-energy fabrication processes is becoming increasingly important, making technological innovations in electronic device fabrication processes an urgent priority.

Seiko Epson Corporation is the leader in using novel inkjet technology in full-scale liquid crystal panel production to save both materials and energy. One of the company's pioneering efforts was the development and practical application of an inkjet system for forming alignment layers on liquid crystal panels that are being shipped in finished products.

The flexographic printing process conventionally used to form the alignment layer wastes a lot of the valuable alignment layer material and uses a huge volume of organic solvents for printing plate maintenance. Epson's inkjet system, on the other hand, deposits the alignment layer material only where it is needed, and so uses 75% fewer chemicals by volume. In addition to dramatically reducing chemical consumption, the inkjet system also significantly improves display quality by enabling extremely tight control over alignment layer thickness. These advances enabled Epson to become the first to successfully use an inkjet system to form alignment layers in mass production.

Epson is continuing to drive inkjet technology forward. We have developed an inkjet system that prints color filters on Generation 8 glass substrates for large-screen LCD panels, and we have the system running in volume production within the LCD industry. The color filter printing system reduces the number of steps and materials needed in conventional photolithographic filter formation process.

Epson's inkjet system is attracting attention as a highly effective means to save both materials and energy in the device fabrication process.