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## Elemental Technologies for Advanced Imaging Devices

Improving the performance of cameras

### Outline

We are developing new imaging devices to improve the performance of cameras. We introduce the elemental technologies for an organic imaging device that implements a compact, high-image-quality single-chip camera and a 3D integrated imaging device that is intended to provide both an ultrahigh-definition and a high frame frequency.

### Features

#### ● Continuous lamination technology for organic imaging devices

The newly developed continuous lamination technology enables us to stack three different organic photoconductive films and charge readout TFT\* circuits on top of each other. Each layer is sensitive to red, green, or blue, and an optical image is focused on each one. By using this technology, we can keep the spacing of the three organic photoconductive films to within 10 μm.

#### ● Circuit formation technology for 3D integrated imaging device

The 3D integrated imaging device consists of stacked substrates that provided with functions such as photodetection and signal processing. Towards the implementation of this device, we have developed technology for fabricating a 3D integrated logic circuit, which serves as the basic element for the signal processing circuit, by direct bonding of substrates on which the transistors are formed.

### In the works

We are working on increasing the definition of the organic imaging devices by making TFT circuitry more compact and integrated. We are also verifying the signal readout operations of the 3D integrated imaging device in the depthwise direction of the device.

- The research into TFT circuits for organic imaging devices is being conducted in collaboration with Kochi University of Technology.
- Part of the research into organic photoconductive films for organic imaging devices is being conducted in collaboration with Saitama University.
- The research into 3D integrated imaging devices is being conducted in collaboration with the University of Tokyo.

\* TFT: Thin-Film Transistor.

