

October 6, 2010

**AGC to Advance into Large-size Photomask Substrate Market for LCDs
with High-quality, Low-cost Synthetic Quartz Materials**



AGC (Asahi Glass Co., Ltd.; Head Office: Tokyo; President and CEO: Kazuhiko Ishimura) will start sales of large-size quartz photomask substrates for thin film transistor (TFT) liquid crystal displays (LCDs). Based on synthetic quartz production/processing technology that AGC has developed over years, this product ensures high-quality and can be produced at low cost. AGC Electronics Co., Ltd. (Head Office: Fukushima Prefecture) will commence the production in 2011, aiming for sales of 3.0 billion yen in 2014.

In the patterning process, which is a part of the overall manufacturing process for TFT LCD panels, light is irradiated on synthetic quartz glass called a photomask. Through the exposure to the light, the microscopic pattern such as an IC pattern printed on the photomask is transferred on a glass substrate to form a TFT circuit or color filter. To accurately project a circuit pattern, synthetic quartz glass must not contain any defect, distortion, or impurities.

Base on fine glass, fine chemical and other technologies, AGC has elaborated synthetic quartz production/processing technology for semiconductor manufacturing. Synthetic quartz lens for ArF laser has a particularly good reputation among customers for such properties that “eliminating defects and distortion has minimized changes in light refraction” and “maximizing the purity has increased durability against laser”. In addition, AGC offers many other products which are created based on its high-level polishing (Arithmetic Mean Deviation of the Profile: $Ra \leq 0.2\text{nm}$) and cleaning technologies.

This time, AGC has applied the synthetic quartz production/processing technology it has developed in the semiconductor production industry and successfully developed a large-size synthetic-quartz photomask substrate for LCDs to meet the ongoing market demand for larger-size panels. The characteristics of the product are as follows:

| | |
|----------------------------|---|
| High optical quality: | No defect or distortion (striae-free in three directions) |
| High purity: | SiO ₂ purity of 99.999999% (1,000 times higher than the conventional products) |
| Available in larger sizes: | Can be applied to 10th-generation size or larger glass substrates |
| Low cost: | Can be produced at lower costs than conventional products |

Leveraging its comprehensive glass technologies ranging from glass composition design to processing, AGC will continue to contribute to the growth and development of the flat panel display market by supplying glass substrates and other components and materials for displays as well as for the production process.

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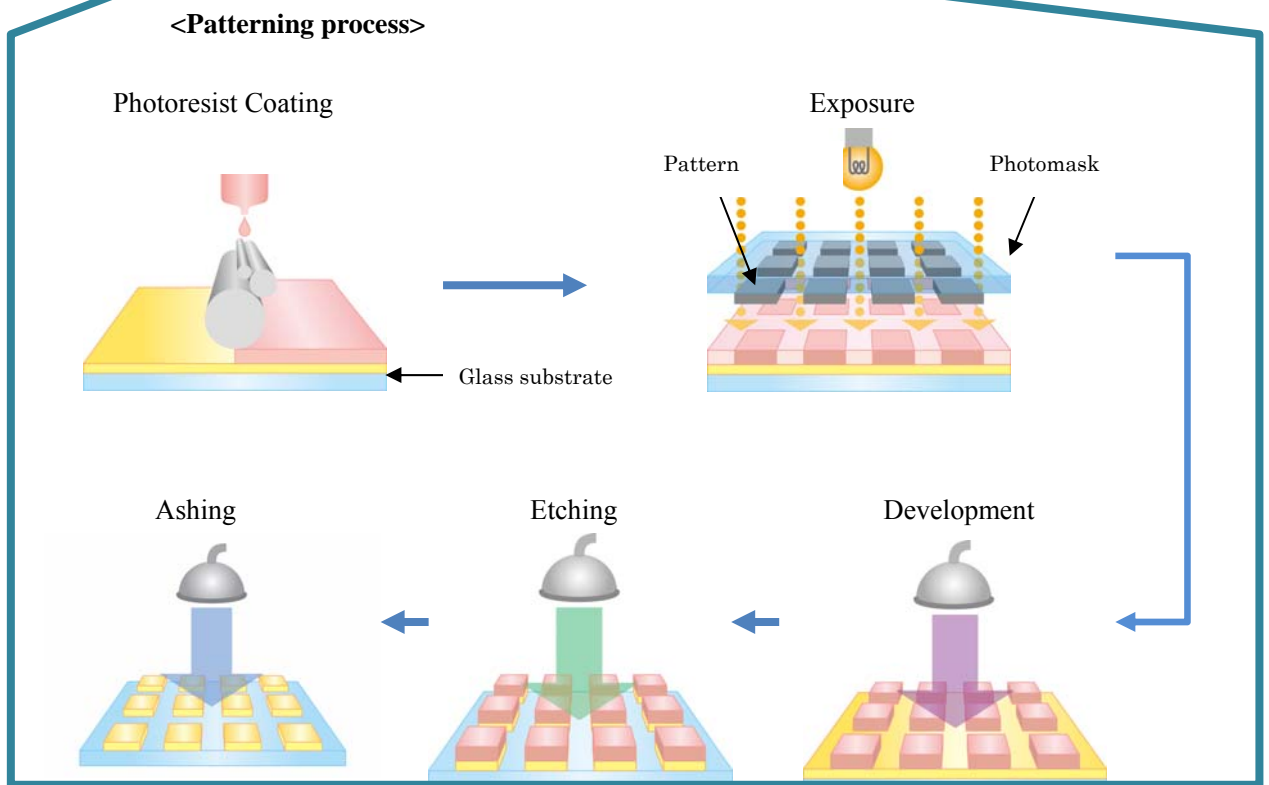
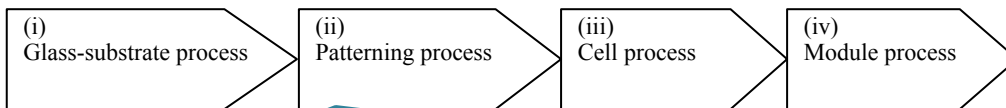
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Reference Materials

1. Image of photomask used



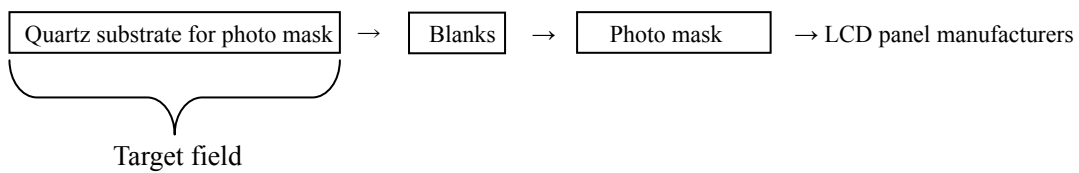
2. LCD manufacturing process



(Outline of each process)

- (i) Glass-substrate process
Cutting glass substrates.
- (ii) Patterning process
Forming circuits by repeated exposure, development, etching, and coating processes.
- (iii) Cell process
Combining the front glass plate and the rear glass plate, and filling the space between the two panels with liquid crystal.
- (iv) Module process
Completing an LCD by attaching a backlight and a driver IC.

3. Value chain of photomask for LCDs



4. Correlation between photo masks and glass substrates

(mm)

| Photomask size | | Glass substrate size |
|----------------|-----------------|----------------------|
| 1620×1780 | 10th generation | 2800×3000 |
| 1220×1400 | 8th generation | 2200×2500 |
| 850×1200 | 7th generation | 1870×2200 |
| 800×920 | 6th generation | 1500×1850 |
| 700×800 | 5th generation | 1000×1300 |
| 450×550 | 4th generation | 680×880 |