High-throughput, single-pass selective area crystallization of thin-film silicon substrates

Thin-film transistors are a cornerstone of modern electronics. In practice, conventional methods to make thin film transistors are generally unable to selectively crystallize specific areas of the silicon substrate and require multiple passes to achieve full crystallization. The combined result is that conventional techniques limit the throughput and decrease the efficiency of thin-film production. This technology addresses both issues by achieving single-scan, selective-area crystallization of thin-film silicon substrates. By only crystallizing the areas of the substrate intended to contain devices in a single scan, the throughput of device manufacture is greatly enhanced. This technology could greatly increase production speed of LCD and OLED displays, helping to bring about the next generation in display technology.

Single-scan selective-area crystallization increases production throughput and efficiency

This technology achieves selective-area crystallization by using two superimposed scanning elements to effectively create a single scan with variable scan velocity. While one scanning element scans at a constant velocity, a second scanning element may alternate between scanning in a parallel and an anti-parallel direction. The effective scan velocity that is the result of superimposing the velocities of the two scanning elements, ultimately allowing selective-area crystallization with a single scan. This technology is compatible with existing standard technologies such as sequential lateral solidification and excimer laser annealing, making it easy to integrate into existing production setups. As such, this technology offers a way to increase the throughput of thin film device production, benefitting OLED, LCD, and other display applications.

Lead Inventor:

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Applications:

- Production of thin-film substrates for LCDs and OLEDs
High-area substrate production
Increasing throughput of current device production

**Advantages:**

- High throughput process
- Achieves selective area crystallization in a single scan
- Compatible with excimer laser annealing and sequential later solidification techniques
- Compatible with low-temperature polycrystalline silicon technology

**Patent Information:**

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