High frequency pulsed laser SLS method for production of highly uniform polysilicon thin films

Technology #m06-011

High performance thin film transistors (TFTs) require the production of highly uniform films of polysilicon (polycrystalline silicon). Sequential lateral solidification (SLS) is one technique for producing polycrystalline films, which uses controlled laser pulses to melt a region of amorphous or polycrystalline thin film on a substrate. Substrates fabricated by SLS are limited by the microstructure of the polycrystalline thin film. This technology improves the uniformity of the crystalline structure produced by SLS, by aligning the beamlets of an excimer laser and overlapping sequential passes to reduce the amount of edge area in the grain structure, where non-uniformities tend to occur. Using this SLS method for processing thin films provides the potential for efficient, improved thin film device fabrication on a number of substrates, including those intolerable to heat.

Simplified single wavelength laser source for a low cost, compact, highly sensitive sensor with digital output

This technology improves 2-shot SLS processing of polycrystalline thin films by aligning the laser beam perpendicular to the scan direction and optimizing the overlap between subsequent scans. This optimization of laser alignment and controlled pulses reduces the amount of edge area typically associated with inconsistent electrical performance. This technology can be used with conventional 2-shot SLS schemes or may incorporate a higher number of pulses.

Lead Inventor:

James Im, Ph.D.

Applications:

- Production of high performance active matrix LCD and OLED displays
- Production of high efficiency polysilicon solar cells
- Fabrication of 3D integrated circuits
Advantages:

- Improves uniformity of polysilicon thin films produced using Sequential Lateral Solidification (SLS)

Patent Information:

Patent (US 13/892,904)

Tech Ventures Reference: IR M06-011

Inventors

James S. Im