Annealing of crystalline silicon thin films is a critical step in the production of thin film transistors. However, current crystallization methods either lack control over film thickness or are energy intensive. This technology combines complete or partial melting crystallization with sequential laser firing to produce highly uniform silicon thin film transistors of controlled thickness with low energy requirements. As a result, this technology provides a robust method to produce precise thin film transistors for research and optimization applications. Additionally, this technology may be applied in the manufacturing of thin film transistors for consumer electronic flat panel display devices.

**Highly controlled and efficient production of uniform thin film transistors**

This technology enables the fabrication of highly uniform thin film transistors of controlled thickness for both research applications and consumer electronic goods. Using melt crystallization and firing lasers either during solidification or when solidification is just complete, the thickness and uniformity of thin films may be controlled. This technology combines low energy crystallization and the precision of excimer laser firing, resulting in an annealing method that is less energy intensive than traditional excimer laser annealing and produces higher quality films than traditional melt crystallization. Thin film transistors with varying quality and thickness can be used for researching optimal performance and production processes. The low cost and precision of this technology may also be applied to manufacturing thin film transistors for high performance active matrix liquid crystal displays in electronic devices.

**Lead Inventor:**

James Im, Ph.D.

**Applications:**

- Thin film transistors for active matrix liquid crystal displays in flat panel consumer electronics, such as televisions, computer monitors, and mobile devices
- Semiconductor and transistor fabrication
- Optimization and research of silicon thin films

**Advantages:**

- Controls thin film thickness during fabrication with high precision
- Enables optimization of crystallization for improved performance or production
- Reduces energy costs of thin film transistor production
- Facilitates processing of thin film transistors with high uniformity and electron mobility

**Patent Information:**

Patent Pending

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