Molecular Flux Measurement Device and Method (#3556)

A device and method of measuring the molecular flux leaving an effusion cell in a molecular beam epitaxy system

Georgia Tech inventors have created a device and method of measuring the molecular flux leaving an effusion cell in a molecular beam epitaxy system. The device consists of a metallic crucible with an optional dielectric shield and further optional metallic outer coating to act as an insulator and guard terminal. This device can be used in a closed loop control system to provide in-situ flux control and stability by feeding the amplified current signal to a process controller.

Benefits/Advantages

- Higher precision
- Detects flux in-situ
- Cheaper

Potential Commercial Applications

- Replace all known effusion cells
- Molecular beam epitaxy (MBE)

Background/Context for This Invention

Thin film deposition techniques require precise control of deposition parameters to produce the complex structures demanded for current and next generation applications. For example, molecular beam epitaxy (MBE) is a versatile technique for depositing single-crystal semiconducting, insulating, or metallic materials used in fabricating state-of-the-art electronic and opto-electronic devices. Current generation MBE machines rely on methods that are time-consuming, provide no real-time feedback, and are only marginally accurate when growing demanding structures. These problems directly increase device manufacturing costs.

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For more information about this technology, please visit:
https://industry.gatech.edu/technology/molecular-flux-measurement-device-and-method