



Combinatorial Laser Molecular Beam Epitaxy for Atomically Controlled Synthesis of Oxide Tin Films

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Laser heating system

Max. temp.: ~1200 °C
Gradient: ~200 °C/cm

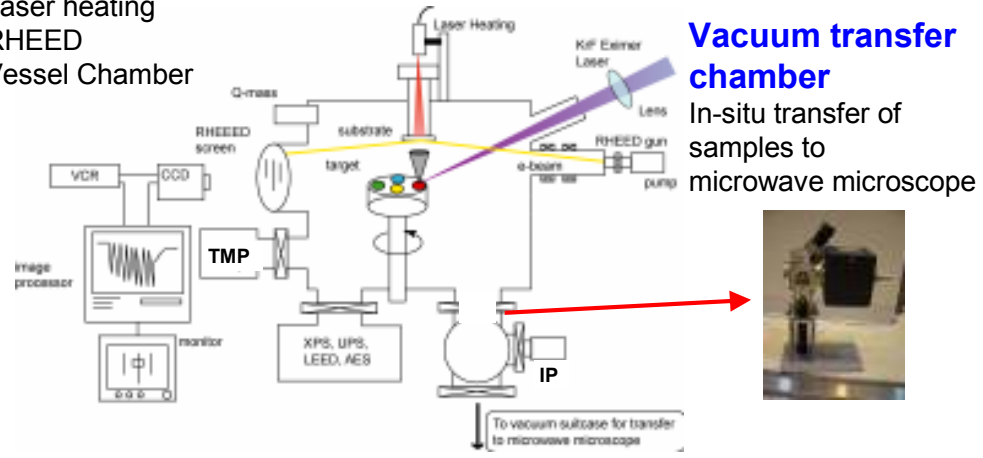
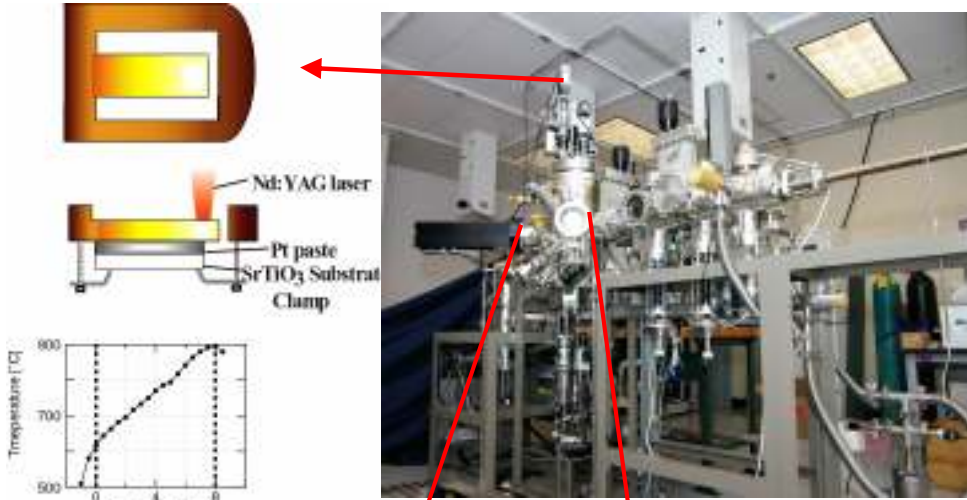
Laser Molecular Beam Epitaxy Chamber (Set up summer 2005)

Schematic of combinatorial laser molecular beam epitaxy (LMBE)

- UHV
- Laser heating
- RHEED
- Vessel Chamber

Vacuum transfer chamber

In-situ transfer of samples to microwave microscope

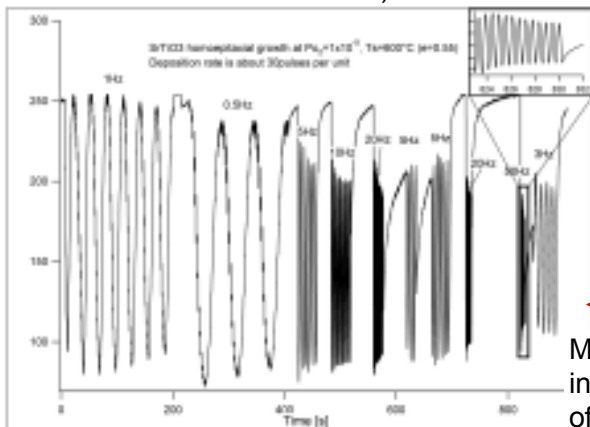


Shadow masks

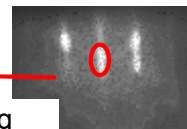
(allow us to make linear and ternary composition spread libraries)

RHEED oscillation

(for atomic layer control during thin film fabrications)



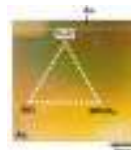
RHEED pattern



Monitoring intensity of specular spot

Pseudo ternary system

Sample photo



Fabrication of ternary system

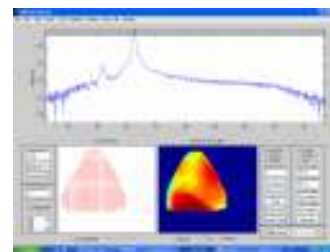


Control panel on computer

(Automated to control temperature, shadow mask, targets...)



Analysis of combinatorial libraries



Summary:

We have set up a combinatorial laser molecular beam epitaxy chamber, which allows us to fabricate **atomic layer** controlled oxide thin films using in-situ RHEED oscillation. The system also allows us to make a variety of combinatorial libraries, including linear and ternary **composition spreads**, and **temperature gradient** libraries.