

APPLICATION NOTE

PRECISE EPILAYER CONTROL FROM FLUX TRANSIENTS < 1.2 %

MBE 49 production system

Effusion cells are one of the critical components in any MBE system and are the basis of nearly all beam generation. At each shutter opening, an overpressure in the beam flux is usually observed (flux transient). This can, in some cases, impact on the quality of the structures grown.

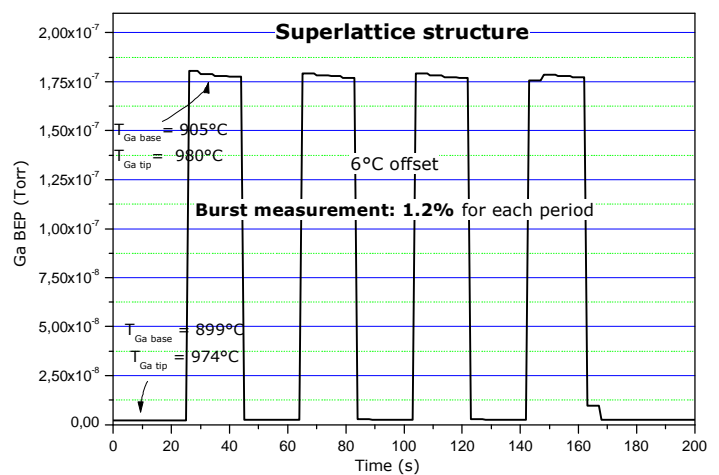
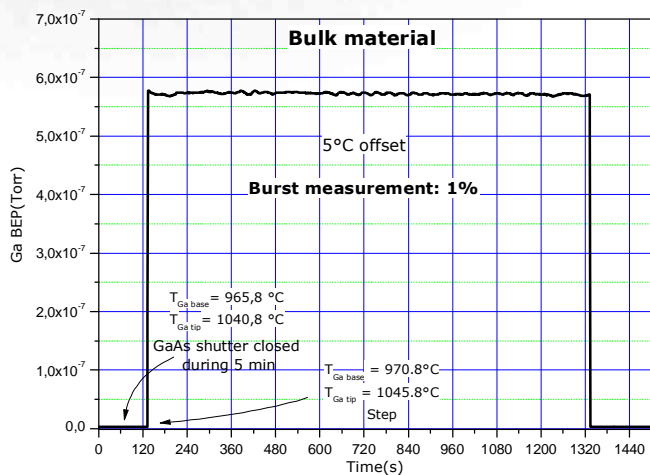
This flux transient phenomena has been studied on the MBE 49 (multi 4") production system at Riber's **Process Technology Center** in Lille. Ga flux transients developed from double filament effusion cells (model ABN 700DF) were measured and recorded on shutter opening under different process conditions.

The flux transient behaviour of the cell was minimized by applying a negative temperature offset prior to shutter opening. The temperature offset is easily and precisely controlled by Riber MBE software, Crystal. Use of the technique does not affect Riber's excellent steady state flux stability yet virtually eliminates unwanted transients.

Results

Ga burst measurements were performed on different structures: bulk layers and superlattices (SL).

- Ga flux transient for bulk material: **1.0 %** with an offset of 5°C.
- Ga flux transient for SL growth: **1.2 %** for each period, with an offset of 6°C applied at each shutter opening.



For more information please contact info@riber.com