

Alta CVD 300: Phase-Change Memory Processes and Equipment

Background

Integrated circuits are becoming increasingly smaller and incorporating a wider variety of functions (the smartphone is a good example of this). Electronic chips must in particular include memory elements. However, **current memory technology is reaching its limits in terms of miniaturization**, so an alternative will be needed to meet future technology needs.

One promising technology is phase-change memory, which involves depositing a nanometric film of a material whose structure—crystalline or amorphous—represents either a 1 or a 0 stored in the memory. The Alta CVD 300 project aims to develop the process and equipment needed to make these material deposition on 300 mm diameter wafers. The global market for phase-change memory and manufacturing equipment is estimated to reach several billion dollars within the next five years.

Partners

Corporate

STMicroelectronics - Air Liquide Electronic Systems (ALES)

SME

Altatech Semiconductor

Research laboratories

CEA-Leti - CNRS-LTM

Key figures

Budget: €4.6 million

Duration: 36 months

Human resources allocated: 19.85 FTE

Innovation

Phase-change memories use special alloys that are deposited in thin films on memory chips. Current manufacturing processes can deposit alloys only on flat surfaces, but **to be able to meet future technology needs, a process must be developed that can deposit alloys on 3D surfaces or in nanometric-sized holes.** This can be achieved exclusively by using chemical vapor deposition. Alta CVD 300 incorporates three innovations:

- specific precursors for the alloys;
- CVD equipment that uses an original liquid phase precursor injection/evaporation process;
- and the ability to perform a low temperature plasma-assisted deposition.

