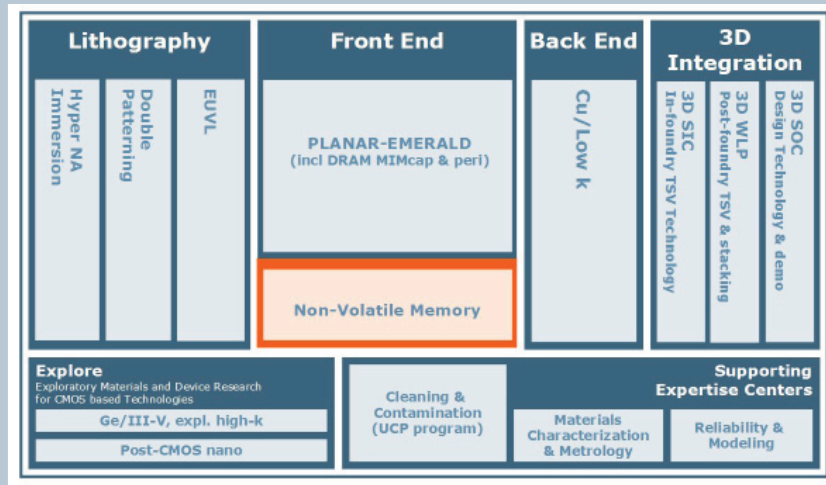


Front-End-of-Line Non-Volatile-Memory

Positioning

This IIAP is part of IMEC's R&D platform towards sub-32nm CMOS:



Scope

The non-volatile memory market continues to boom driven by a large number of new applications requiring ever larger densities and scales of memory.

The IMEC Flash program offers early insight in potential solutions to push the Flash scaling roadmap towards and beyond the 22nm node. The program consists of a core, strongly material- and process-driven research activity on floating-gate & nitride-based memories.

The program covers the following R&D activities:

1. scaling floating-gate technology by introducing high-k materials;
 - high-k materials in tunnel barriers (Variot);
 - high-k materials in interpoly dielectrics;
 - leakage modeling and validation for high-k based stacks.
2. scaling nitride based technology
 - TANOS cells and caps;
 - modeling of the cell characteristics.
3. In addition, the program contains an activity which focuses on emerging and novel memory generations, beyond the above Flash concepts, with the potential to overtake them in one or several market segments.



Structure & Activities

The program is divided in 2 main sub-programs:

- the first part aims to extend the floating-gate roadmap by introducing high-k materials in the tunnel layer as well as in the interpoly dielectric layer;
- the second part aims at a further improvement of nitride-based memory cell concepts in order to make these more competitive with floating gate and eventually enable the take-over at the 32nm node.

In addition to this, a more recent activity is focusing on emerging memory concepts.

Whenever possible, this research is performed in a generic way, so as to make it more easily accessible for different partners.

Partners

1. IDMs;
2. foundries, fablite and fabless companies;
3. key semiconductor equipment and material suppliers.



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