Imec is your strategic partner for translating a challenging device concept or prototype into a manufacturable product, tailored to your specific needs and specifications. Once the product is developed and fulfills specifications, we enable its low-volume manufacturing (up to 1000 wafers/year) by using imec’s fab. Moreover, in case high volume is needed, imec can transfer the process to a foundry in Asia – with which we have an established partnership. Alternatively, we can also transfer the process to your fab or to a foundry of your choice.

To develop your tailored component, our experienced engineering teams can rely on a wide technology portfolio and extended processing capabilities, including, for example, sensors, detectors, MEMS, 3D integration, Si and SiN photonics, wafer handling and packaging, and 90nm/130nm CMOS.

Imec is the only place where you can find an advanced 200mm/8-inch CMOS pilot line (which is also equipped for MEMS fabrication and 3D integration) that combines the process capabilities and quality of a foundry with the flexibility of a lab.

FROM CONCEPT TO MANUFACTURING

Imec’s dedicated development projects are bilateral, tailored to your specific needs. Our teams enable a product starting from either a concept or a prototype: we can develop a manufacturable process of a prototype you might already have, we can integrate on-chip your current product, or investigate how to tackle a specific application by using semiconductor technology.

The product development can be divided into five main phases:

1. **FEASIBILITY/CONCEPT STUDY (OPTIONAL)**
   - required for very challenging projects
   - fundamental investigation
   - design and simulations

2. **MAIN MODULES DEVELOPMENT**
   - main processing modules are adapted or developed
   - design and simulation are performed

3. **PROTOTYPING**
   - first full loops
   - first device will be produced for customer evaluation

4. **ENGINEERING**
   - processing and design is tuned to achieve specs
   - devices achieve agreed specs

5. **LOW-VOLUME MANUFACTURING OR TRANSFER**
   - Process Macro Qualification (PMQ)
   - low-volume manufacturing
   - transfer to a high-volume foundry or to your fab
INTEGRATION AND PROCESSING CAPABILITIES AT IMEC

For dedicated product development, imec uses its 200mm CMOS pilot line, which is also equipped for MEMS fabrication and 3D integration. It comprises:

Full CMOS compatible flow capabilities
- 180nm lines on 200mm wafers
- 193nm DUV ASML lithography available

Wafer handling and packaging
- Processing on Si, SOI, fused silica or glass
- Wafer thinning down to 20µm, grinding and CMP
- Wafer-to-wafer bonding: silicon or glass
- Chip-to-wafer bonding
- Wafer-level bonding of MEMS on CMOS substrates
- Custom post-processing on wafers from other foundries

Materials
- Broad variety of polymers for wafer-scale integration
- Low impedance, corrosion resistive electrode materials
- ALD with sub-nm thickness control, high-k dielectrics
- Electroplating of Cu, Sn, Ni
- Exotic materials introduction into CMOS environment and new material deposition development upon request

Special features
- Through-silicon wafer etch capability
- Bumping and through-silicon via integration
- Extensive in-line metrology and defect characterization, features down to 50nm
- State-of-the-art optical waveguide performance for visible light, NIR, IR
- Integrated optical filter stacks

TECHNOLOGY PORTFOLIO AT IMEC

At imec, you can find expertise in many different technology domains. This wide-ranging technology toolbox can be used to enable a chip for your application, or to tackle the challenges required to manufacture your unique device. Our technology portfolio includes:

- (Advanced) MEMS
- Si photonics
- SiN photonics:
  - For processing SiN photonic components standalone or on top of a (foundry) imager
  - Applications: sensors, spectroscopy, solid state lidar
- 3D integration
- Versatile platform to enable different type of device topologies
- Design and simulation
- Microfluidics
- Novel materials
- ...

Example: chip-to-wafer bonding

Example: high-quality EUV sensor dies, developed for ASML’s EUV litho tools

Imec’s 200mm/8-inch CMOS pilot line

AMERICAS
raffaella.borzi@imec.be
T +1 408 386 8357

JAPAN
isao.kawata@imec.be
T +81 90 9367 8463

CHINA
timo.dong@imec-cn.cn
+86 13564515130

TAIWAN & SE-ASIA
mavis.ho@imec.be
T +886 989 837 678

EUROPE & ISRAEL
michel.windal@imec.be
+32 478 96 67 29

VIETNAM, BRAZIL, RUSSIA, MID EAST, INDIA
max.mirgoli@imec.be
T +1 415 480 4519

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imec • Kapeldreef 75 • 3001 Leuven • Belgium • www.imec-int.com