

A NEW R&D PECVD CLUSTER SYSTEM FOR THE FABRICATION OF HIGH EFFICIENCY THIN FILM AND HETEROJUNCTION SILICON SOLAR CELLS

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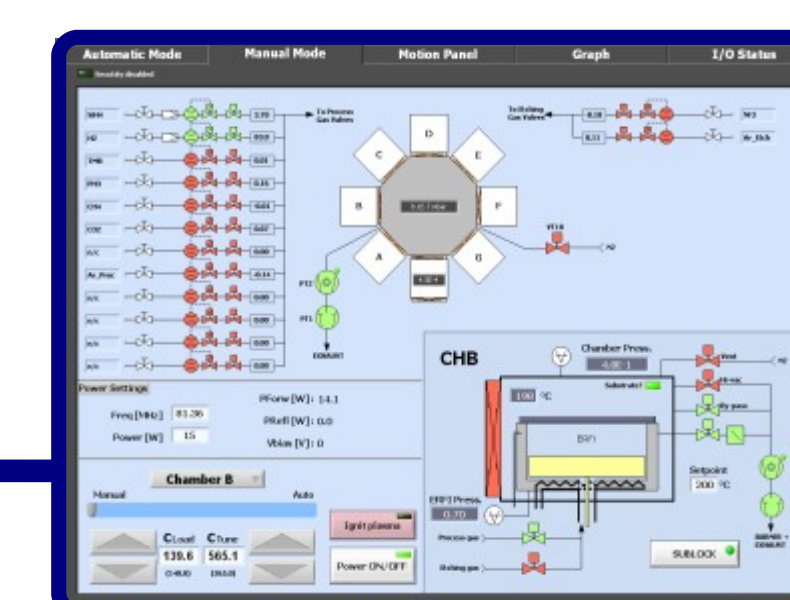
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Motivation and goals

Controlling processes and achieving reproducible results over short and long periods of time is a permanent challenge for researchers in photovoltaics. Based on the extensive hardware and plasma processing experience of IMT Neuchâtel, INDEOtec SA has developed a new generation of state-of-the-art multi-chamber cluster system that offers unique processing capabilities. With this system INDEOtec expects a productivity boost of R&D of thin film and c-Si heterojunction solar cells, as well as a faster transfer of processes from lab to production.



OCTOPUS by INDEOtec



MULTI CHAMBER TOOL

Very compact and modular system design with 8 ports for accommodation of

- Load-Lock
- Up to 7 deposition chambers
- Characterization chambers according to customer requirements

PECVD CHAMBERS

Designed for development of amorphous and microcrystalline silicon solar cells and heterojunction c-Si solar cells.

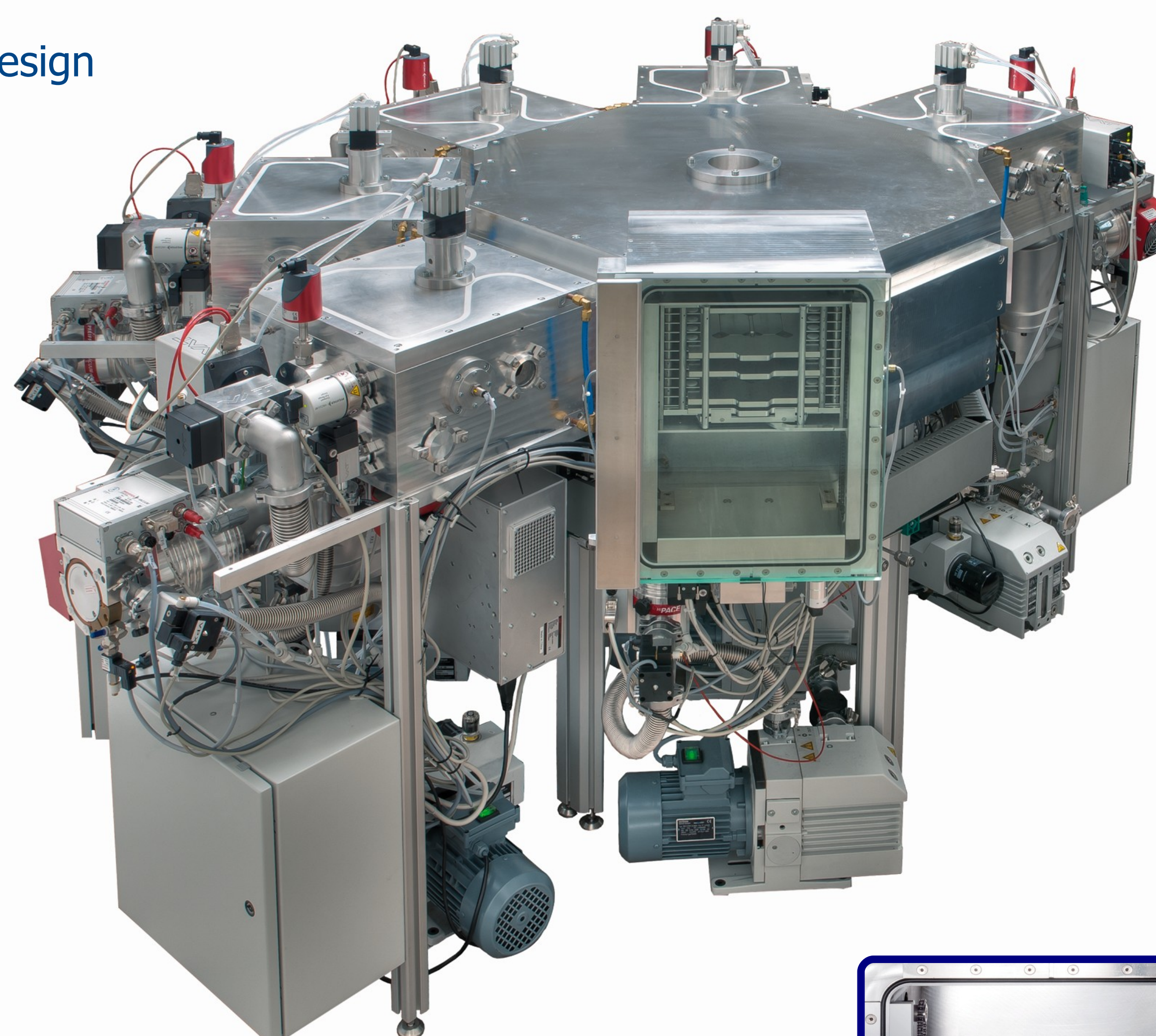
High system versatility:

- Size: up to 125 x 125 mm²
- Freq: 13.56 - 100 MHz
- Press: 0.1- 10 mbar
- P. dens: up to 0.4W/cm²
- Elec. Gap: 8 - 15 nm



PECVD PROCESS

- Gas flow regulation by DMFC
- Automated ignition system
- High homogeneity (< 5 % w/ 8 mm edge excl.) in wide range of settings
- Plasma cleaning with fluorinated gases



FULLY AUTOMATED

User-friendly software interface allowing:

- Manual and automated control of:
 - valve, pump
 - MFC, RF Generator
 - Substrate handling
- Automatic process manager for multi-chambers, multi-substrates and multi-recipes control
- Substrates tracking system
- Live graph display panel
- Process data logging

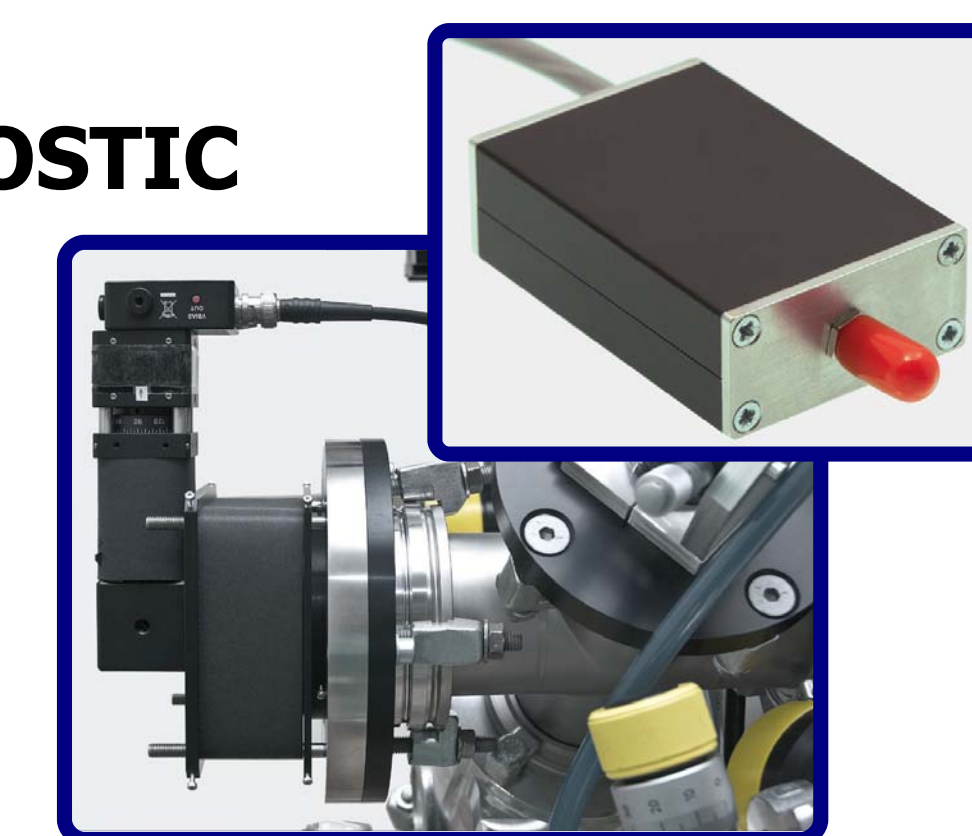


LOAD-LOCK

- Up to 10 substrates

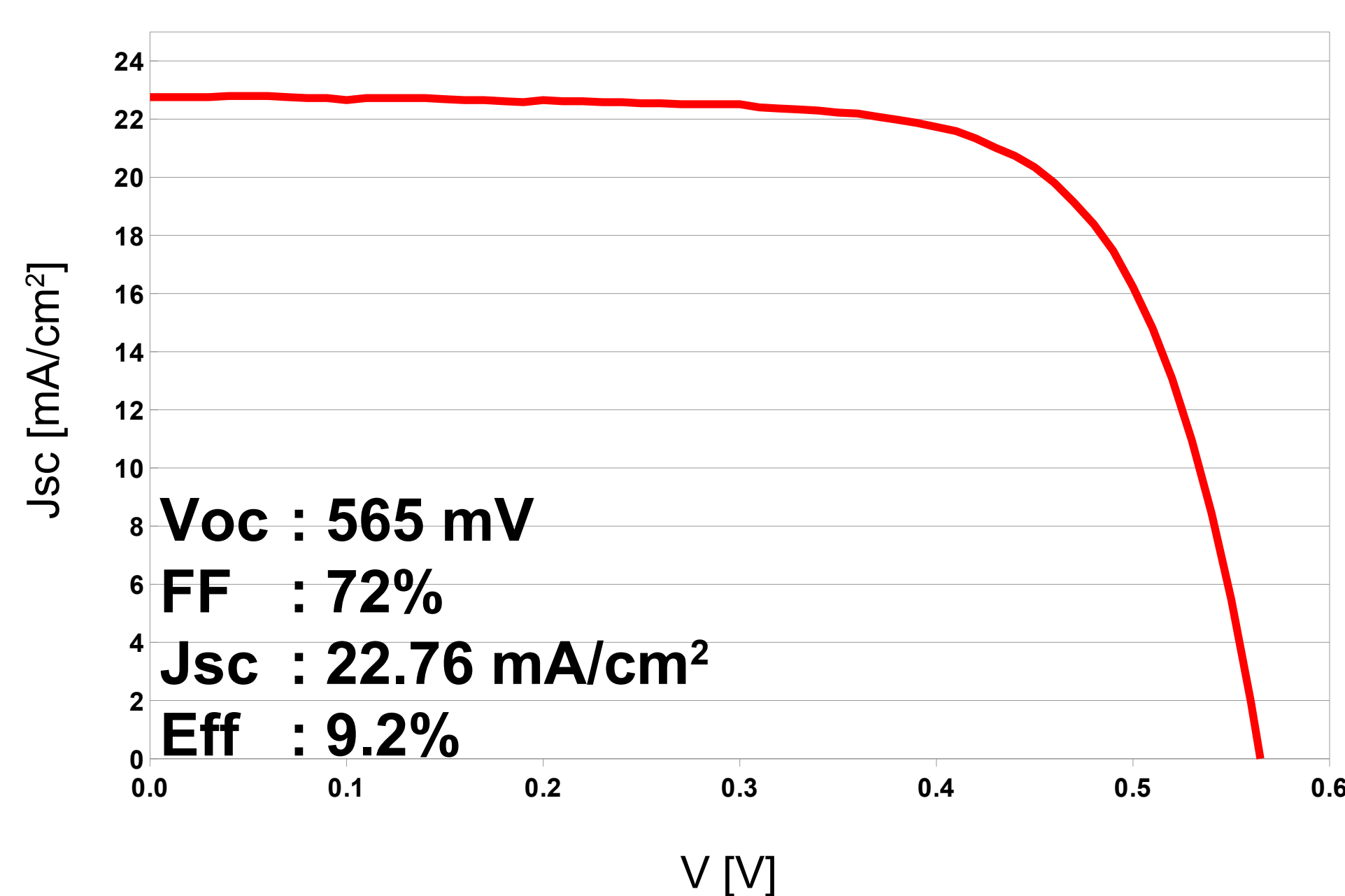
OPTICAL DIAGNOSTIC TOOLS

- OES
- Silane depletion
- Powder detection
- Ignition detector



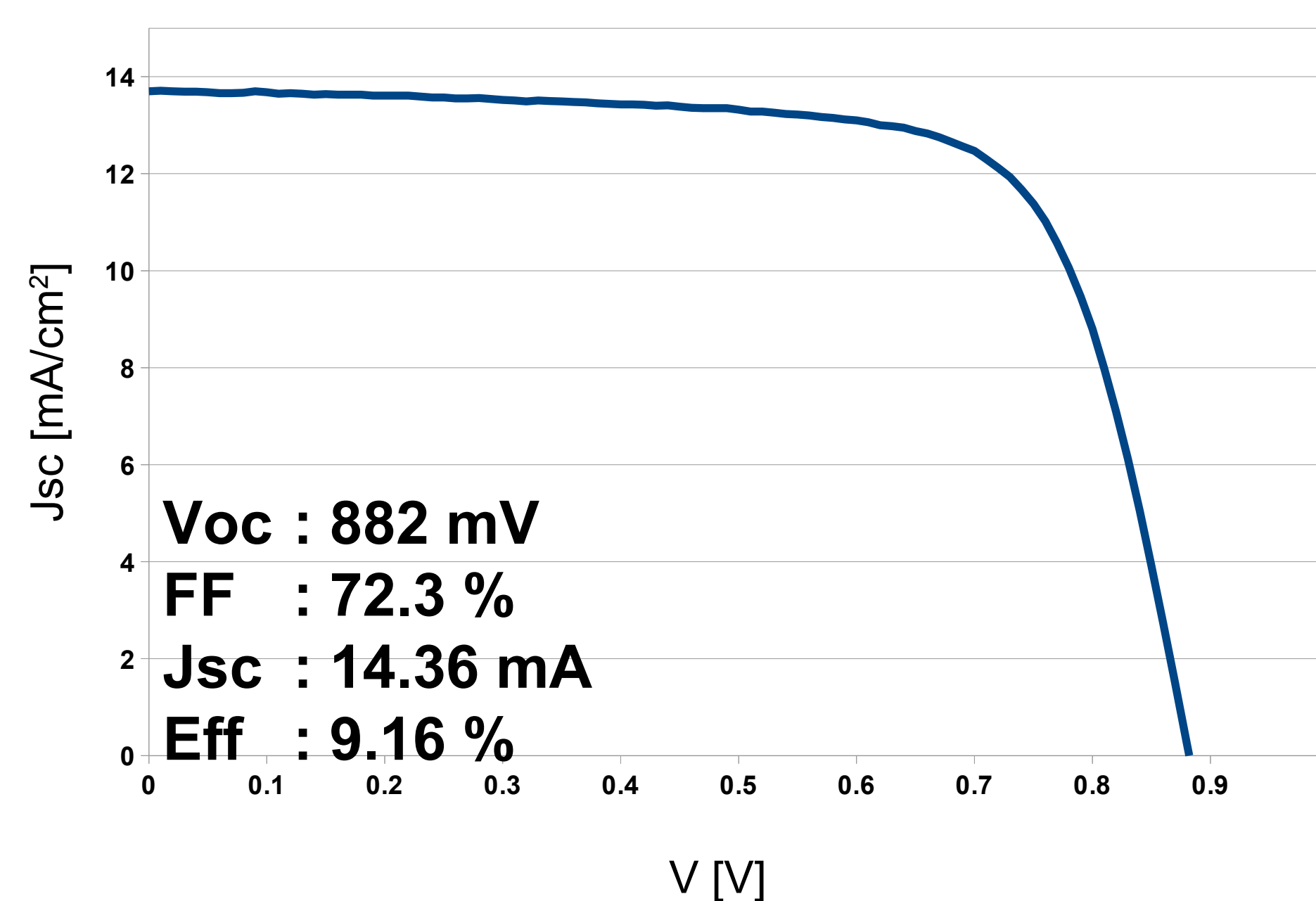
First results achieved in OCTOPUS PECVD chambers

μC-Si:H solar cell



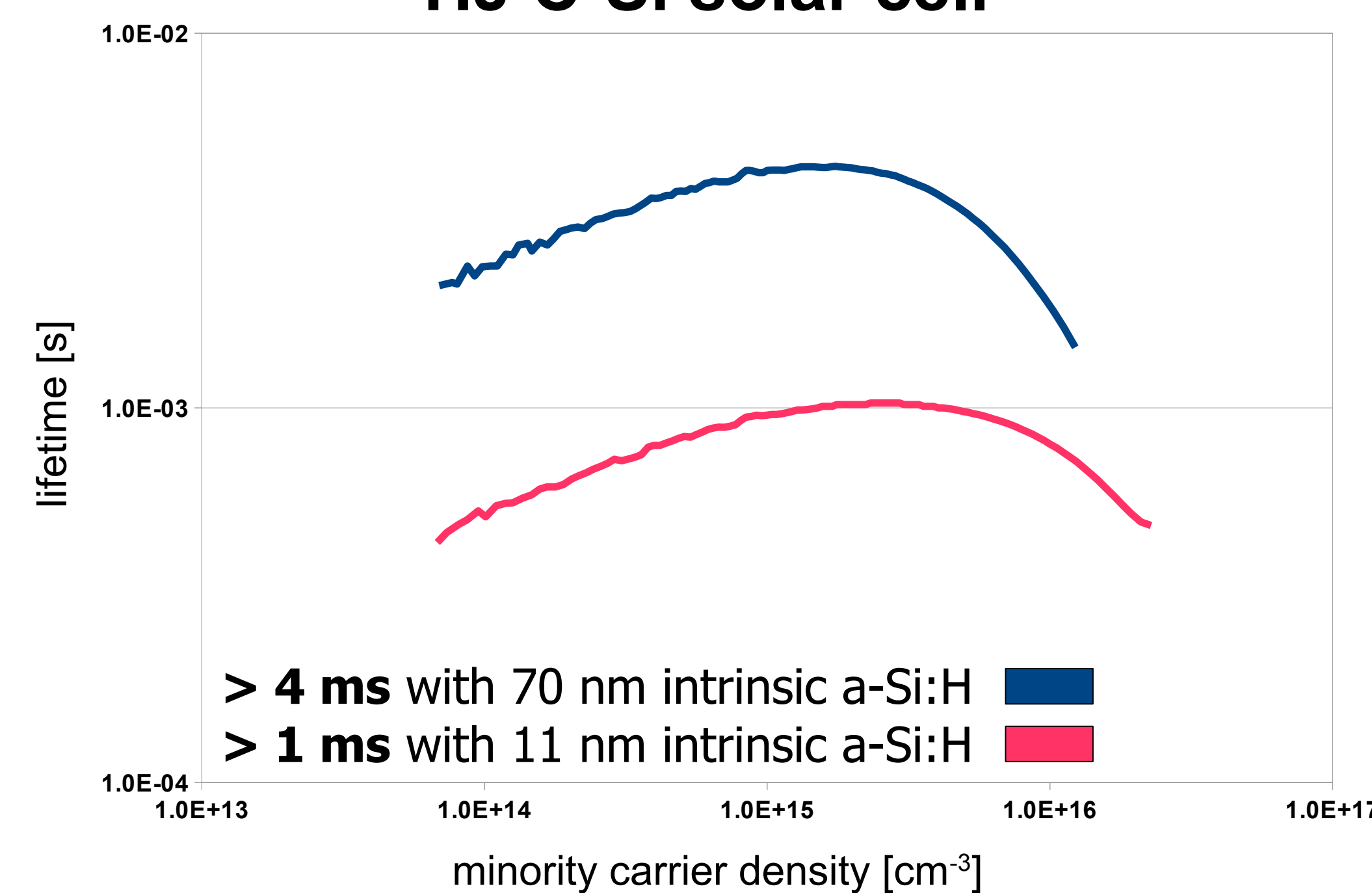
High efficiency single junction microcrystalline silicon solar cell (thickness : 1 μm)

a-Si:H solar cell



First results on single junction amorphous silicon solar cell (thickness : 250 nm)

HJ C-Si solar cell



High quality passivation of c-Si wafers
First result of HJ c-Si solar cell : Efficiency 17.6%