PV@UA

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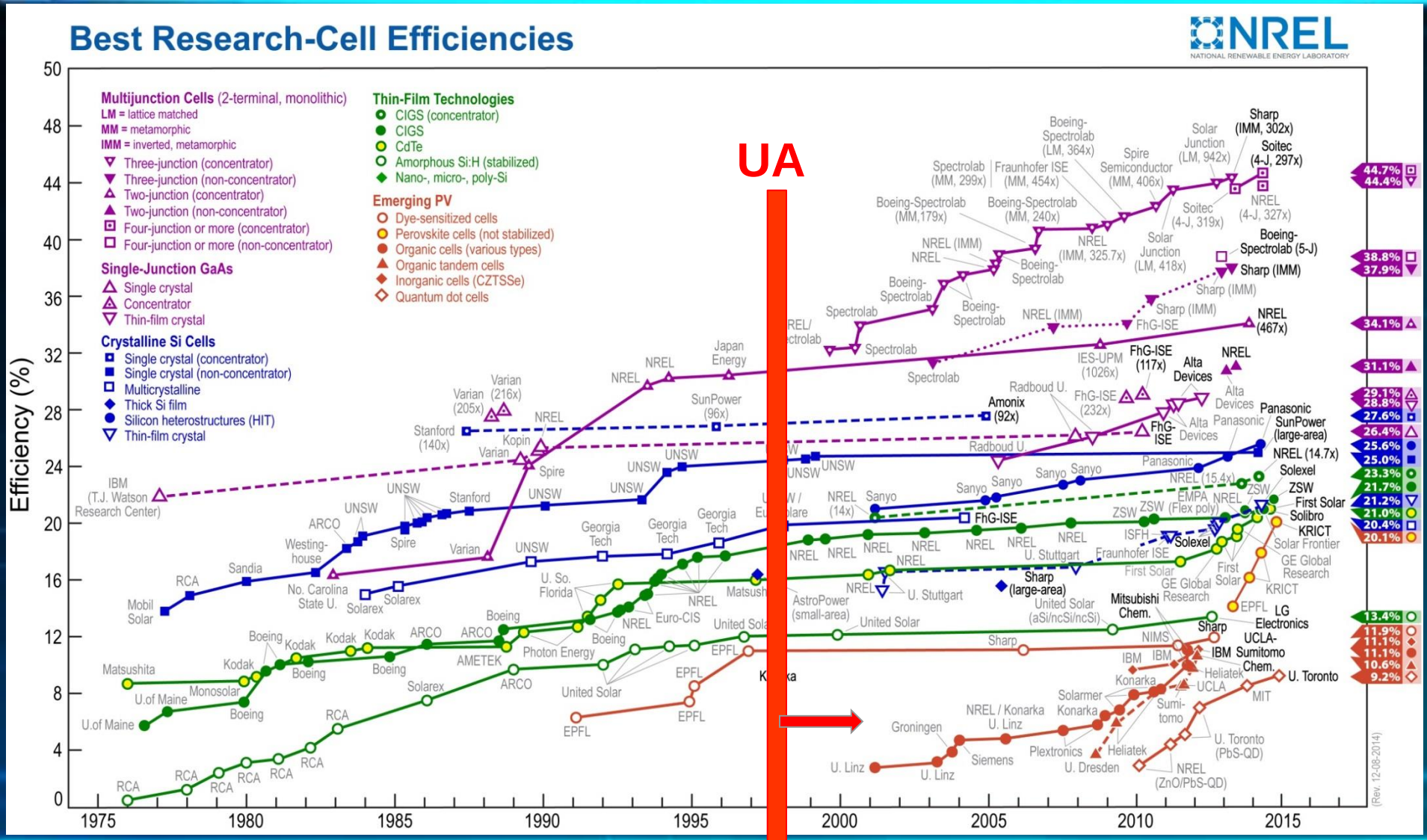
Solar Cells – Brief Review



PV Research & Team @ UA

CIGS & CZTS,Se & CTS & SnS Growth and Basic Characterization

Dr António F da Cunha/Coordinator and technician
Dr Paulo Fernandes/Researcher
Eng. Marta Sousa (MSc)/PhD Student
Samaneh Ranjbar/PhD Student

Liliana Truta (MSc)/PhD Student
João Silva (3rd year MIEF student)/Project Student
Filipe Martinho (3rd year MIEF student)/Project Student

CIGS & CZTS,Se & CTS & SnS Photoluminescence studies

Dr Joaquim Leitão
Eng. Jennifer Teixeira

CIGS & CZTS,Se & CTS & SnS Impedance spectroscopy studies

Dr Manuel Pedro Graça

PV Research & Team @ UA

Dye sensitized solar cells

Mário Lima (MSc)/PhD Student
Ana Cerqueira (MSc)/Researcher

Collaborations in LNEG:

Dr Maria João Brites

Collaborations in the Chemistry department, UA:

Prof Dr Maria da Graça Neves
Dr Ana Pereira

Collaborations in the Physics department, UA:

Joana Rodrigues/PhD Student
Dr Florinda Costa

Some other collaborations

CIGS & CZTS,Se & CTS & SnS collaborations:

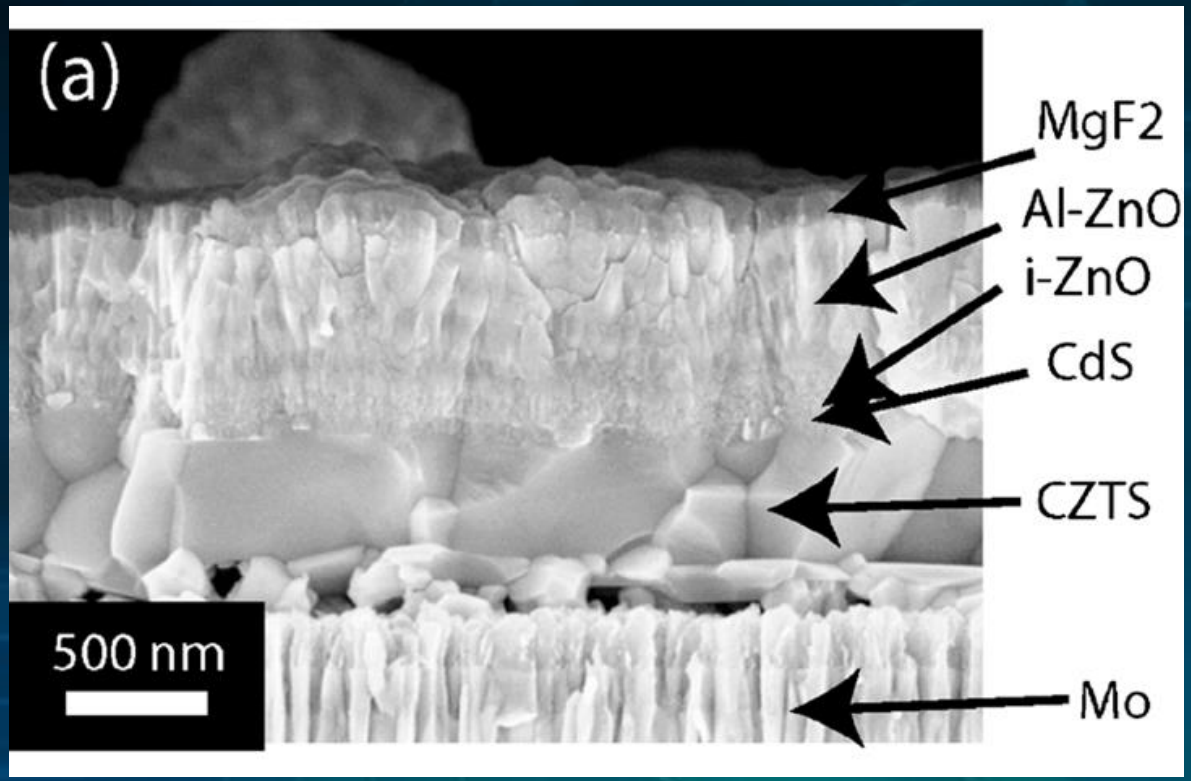
Present:

Universidade Federal de Minas Gerais, Brasil
CICECO
CENIMAT, Univ. Nova de Lisboa
INL

Past:

ETH, Zurich
Helmholtz Zentrum, Berlin

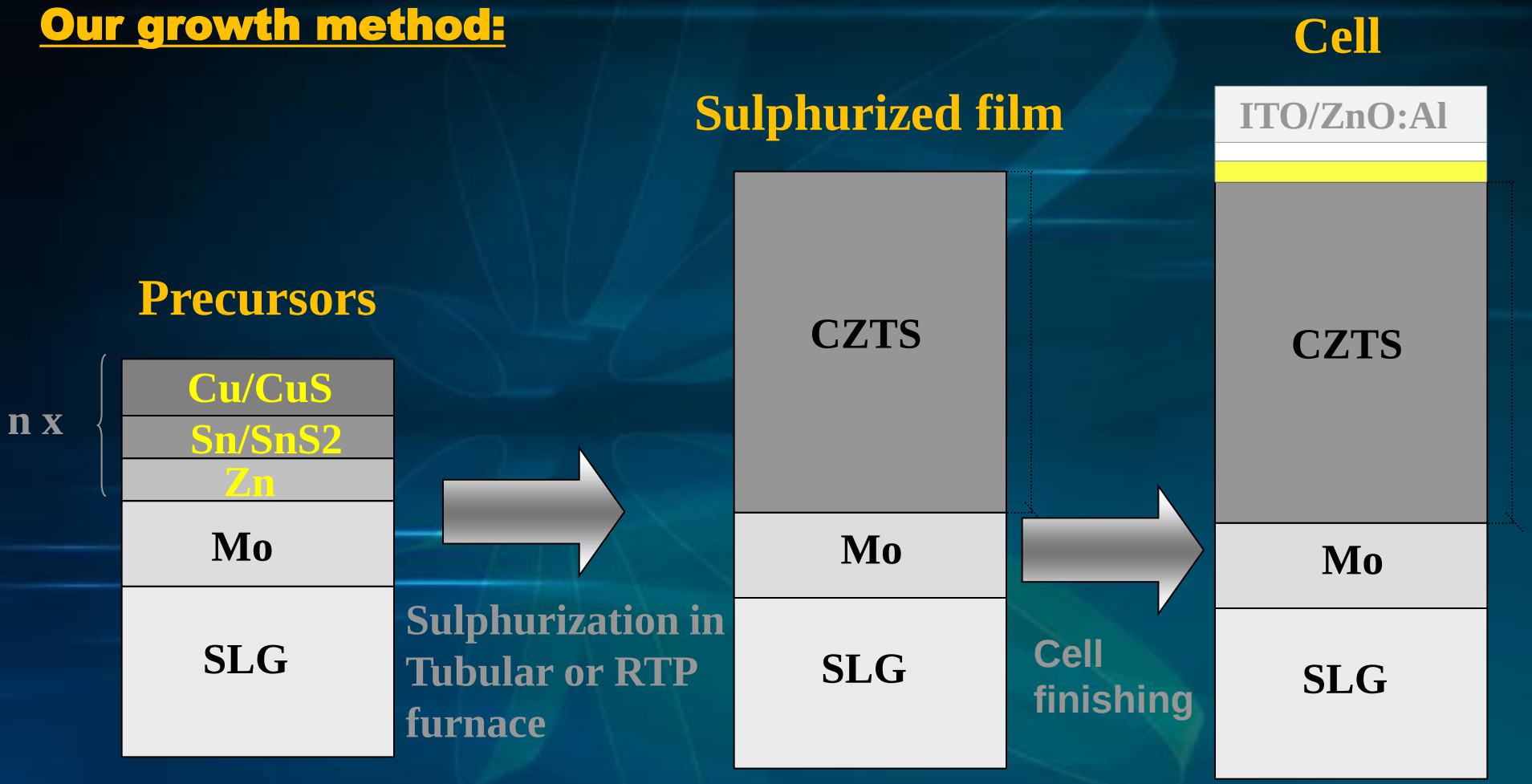
Research Facilities & Techniques



It took **20 years** to set up the infrastructure to be able to attempt to produce such a structure !!!!

CZTS work @ UA

Our growth method:



Research Facilities & Techniques

Materials Preparation & Growth

CIGS & CZTS,Se & CTS & SnS

- DC magnetron sputtering for metals
- RF magnetron sputtering/Thermal evaporation chamber (Hybrid Method)
- Tubular furnaces for Sulphurization/Selenization
- RTP furnace for Sulphurization/Selenization
- Chemical Bath Deposition (CBD) setup
- RF magnetron sputtering for transparent conducting oxides (TCO's)
- E-beam evaporator (under installation)

DSSCs work

- Programmable Hot Plate
- Spray Pyrolysis setup
- Spin coating
- Water Deionizer
- Ultrasonic bath

Research Facilities & Techniques

Characterization

Physics department

- Step profiler - Dektak 150
- Spectrophotometer – UV-VIS-NIR with Integrating sphere/Shimadzu UV 3600
- Hot point probe
- Four point probe
- I-V measurement system
- Room temperature Van der Pauw measurements

Research Facilities & Techniques

Characterization

Physics department

- Visible and ultraviolet Raman spectroscopy (mapping capability)
- Infrared and Visible Photoluminescence spectroscopy
- Excitation Photoluminescence spectroscopy
- C-V-f measurement system
- Impedance spectroscopy
- SEM/EDS/EBIC
- SNOM/AFM
- EPR

Research Facilities & Techniques

Characterization

On Campus UA

- X-ray Diffraction
- ICP-MS
- SEM/EDS
- TEM

Solar Cells @ Univ. Aveiro

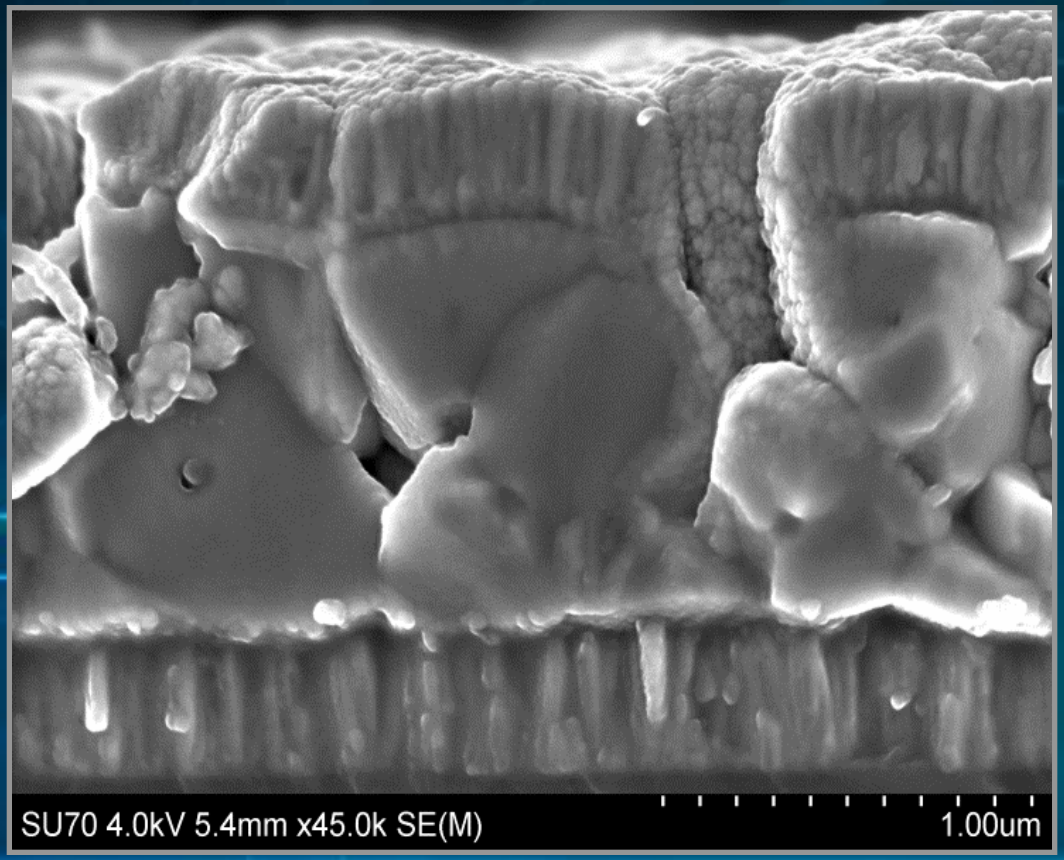
CIGS – Polycrystalline – Efficiency ~ 9%

DSSC – Nano-TiO_2/Dye – Efficiency ~ 9,6%

CZT(S,Se) – Polycrystalline Thin Films ~ 3,1%

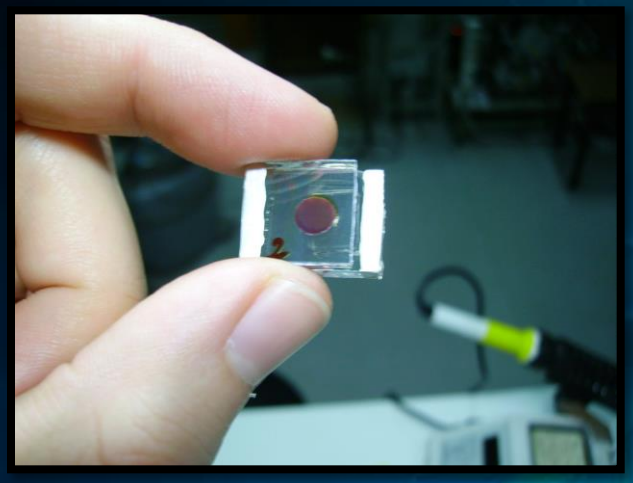
Solar Cells @ Univ. Aveiro

CZTS cell UA



Solar Cells @ Univ. Aveiro

DSSC mini-module made in UA



Solar Cells @ Univ. Aveiro

OPV solar cells in the department of physics, UA

People involved in this line of research:

- Dr Luiz Pereira;
- Dr Luis Rino;
- Students:
    - PhD students: 1 (ongoing)
    - Master students: 4
    - 3rd year project: 2

End