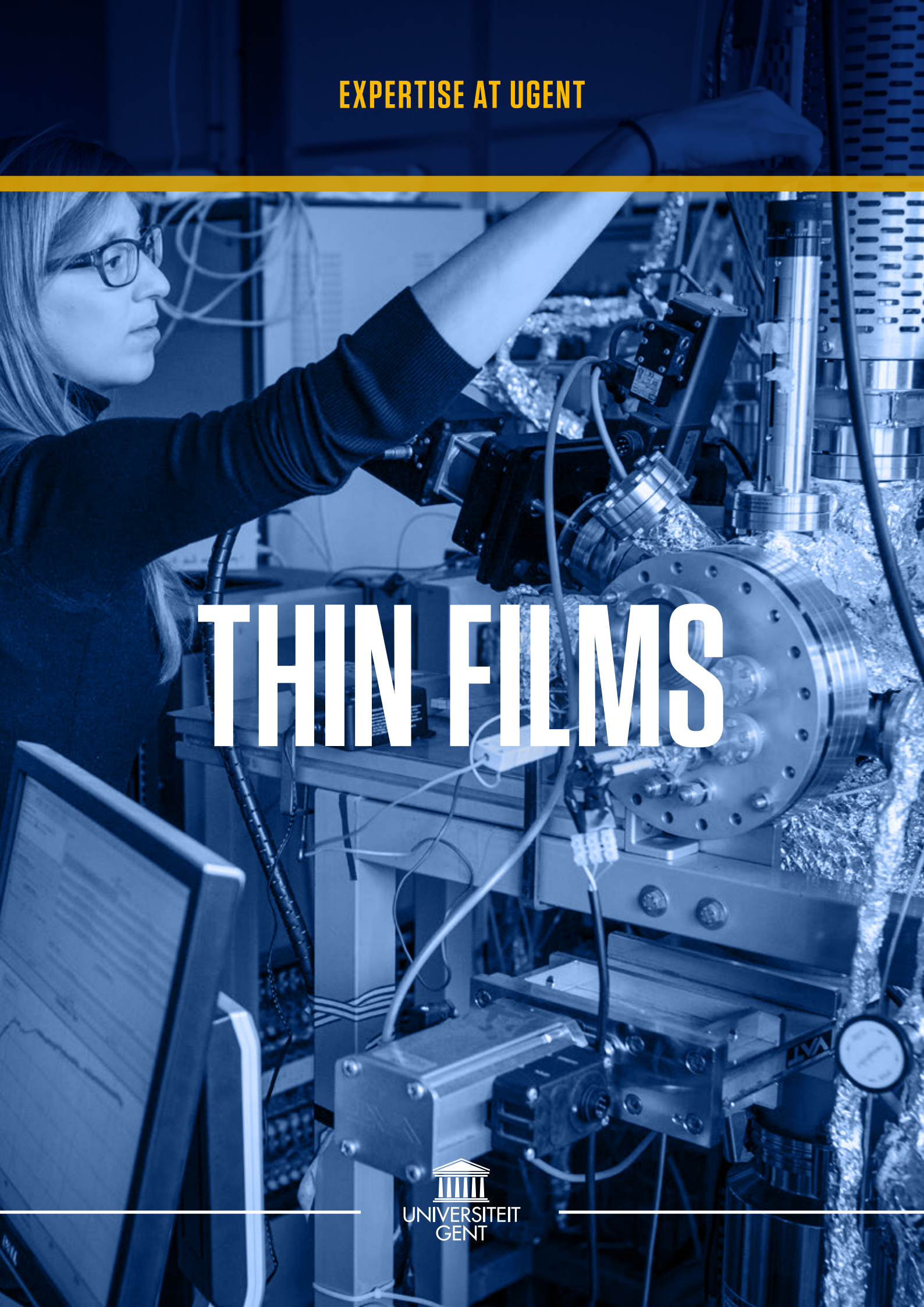
EXPERTISE AT UGENT

THIN FILMS



UNIVERSITEIT GENT

OUR OFFER

OUR DEPOSITION TECHNOLOGIES

ATOMIC LAYER DEPOSITION

is a self-limited growth method that is characterized by alternating exposure of the growing film to chemical precursors, resulting in the sequential deposition of monolayers over the entire sample surface. ALD is ideally suited for coating nanostructures, because of its unique advantages: excellent conformality on 3D objects and atomic level control of layer thickness and composition.
The deposition rate is slow (a couple of nanometer per minute) which makes this a technology ideally suited for nanocoatings. As for magnetron sputtering the technique is used for inorganic and metallic layers.

CHEMICAL SOLUTION DEPOSITION

synthesis is a bottom-up approach for the development of a large variety of materials in bulk or as thin films. A solution with well stabilized metal ions or a sol with dispersed particles will result in a high viscous gel state after aging. This gel can be turned into the desired crystalline phase after an appropriate thermal treatment. A lot of different solution-based synthesis routes can be labeled as a sol-gel process. A classical sol-gel process where metal alkoxides undergo hydrolysis and condensation reactions or a metal –chelate approach are frequently applied.

MAGNETRON SPUTTER DEPOSITION

is a vacuum based technique to grow thin films (film thickness between 10 nm to 1 µm). A wide variety of materials can be deposited, ranging from metals, simple oxides, nitrides and sulphides, to complex materials such as ternary oxides and alloys. There is a similar flexibility for the substrate choice as deposition temperature is low, and no further post-deposition treatment is needed. The main advantage of this technique is its scalability, magnetron sputtering is used to coat both tools in batch coaters as well to coat window glass panes of 4 meter wide. Other advantages is its high level of control both on composition and thickness.

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ATOMIC LAYER DEPOSITION

CHEMICAL SOLUTION DEPOSITION

MAGNETRON SPUTTER DEPOSITION

OUR TOOLBOX

In situ characterization during annealing, ALD and plasma treatment

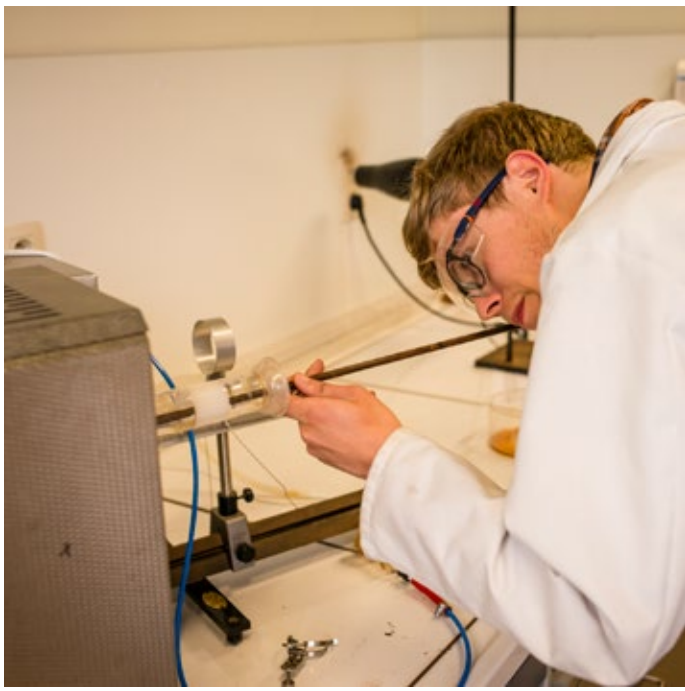
- In situ XRD
- In situ optical emission spectroscopy
- In situ laser light scattering
- In situ Ellipsometer
- In situ 4-point measurements
- In situ wafer curvature measurements
- In situ mass spectroscopy and FTIR

Post-application analysis

- Thermal analysis
- Microstructural & crystallographic analysis
- Texture analysis
- Mapping Equipment
- Magnetic and electric properties

Pre-application analysis

- Solution characterization
- Powder and particle processing
- Powder and particle characterization



OUR EXPERT TEAM

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DRAFT

CoCooN's research (Coating and Contacting of Nanostructures) is situated within the continuing trend towards miniaturization in micro-electronics and is currently focusing on the following topics: **Atomic Layer Deposition** – conformal coating of nanostructured surfaces and nanoporous materials; **In-situ Metrology** – designing and using dedicated systems for in-situ characterization during deposition and/or annealing of thin films; **Combinatorial thin film research** – a time-efficient approach towards obtaining a fundamental understanding of the formation and properties of materials.

SCRIPTS (Sol-gel Centre for Research on Inorganic Powders and Thin films Synthesis) performs research into solution based synthesis routes for the preparation of ceramic coatings, nanoparticles and bulk materials. (1**) Synthesis and stabilization** of stable precursor solutions or nanoparticle suspensions; (2) **Applying the precursors** on the substrate using a variety of techniques (specific expertise in the use of inkjet technology) and finally; (3) Their **conversion** into a gel or crystalline ceramic by controlled heating, are monitored using a variety of analytic and microscopic tools.

DRAFT (Design, Research and Feasibility of Thin films) studies **magnetron sputter deposition** in general. The group started in the 1980's, with the deposition of Zn/Cu alloys on steel cord wire. From this period originates the tradition to develop its own **magnetron sources**. Beside the research on materials of industrial interest, such as superconductors or (photo) catalytic systems, the group focuses on the fundamental aspects of **reactive sputter deposition**.

CONTACT INFORMATION

The Thin Films cluster is supported by the business units
ChemTech, **Plateau (Photonics Innovation Center)**
and **Composites@UGent** aiming to be
the focal point for **industrial collaborations**

The business units facilitate and coordinate a set of **industrial projects**
and manage a **strategic IP portfolio** and its licensing opportunities

The business developers of ChemTech, Plateau (Photonics Innovation Center)
and Composites@UGent are at your disposal:

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