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Director of the CMTC Platform

CMTC : the materials  
characterization center of  
Grenoble Institute of  
Engineering and Management  
Université Grenoble Alpes



2020  
7<sup>th</sup> edition

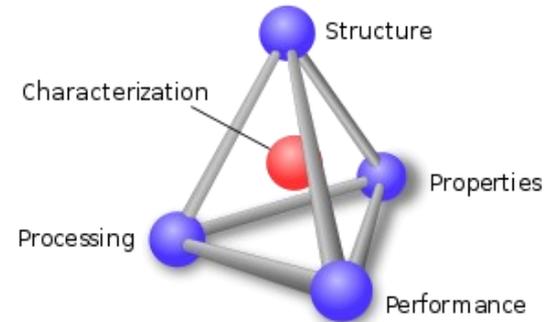


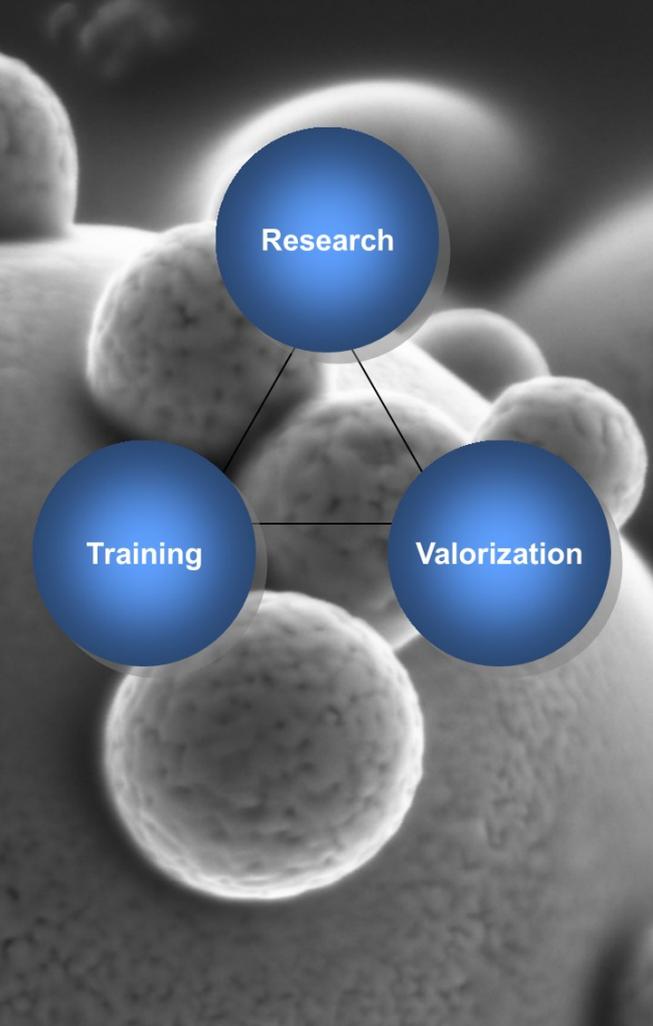
# Consortium des Moyens Technologiques Communs



## CMTC

The materials characterization  
center of Grenoble Institute of  
Engineering and Management  
Univ. Grenoble Alpes





## CMTC Platform

**Created in 1977**

### Field

**Center for physical, chemical and microstructural characterization at various scales and for high performance scientific imaging**

### Missions

**Research :** Providing characterization services required for research programmes carried out by its partners, developing know-how, competencies and new characterization techniques,

**Training :** Providing training in characterization techniques, offering access to characterization resources after training,

**Valorization :** Providing characterization services to other organisations, including companies



3<sup>rd</sup> place in Materials Science  
France 2019

# Department of Materials Science & Engineering



## Member of





# Localisation

## Two sites



Grenoble University Campus of  
Saint Martin d'Hères



Phelma Minatec



# A fully staff unit with 17 state-of-the-art shared characterization equipments

## Facilities

- Electron microscopy (SEM, TEM, FIB, EDS, WDS, EBSD, ASTAR...)
- X-rays (X-ray diffraction, X-ray reflectivity, in-situ)
- Raman spectroscopy
- Surface analysis (XPS)
- X-ray tomography (non-destructive 3D imaging)
- High performance scientific imaging (high-speed, high-resolution cameras and infrared imaging technique)
- Sample preparation
  
- New facility available in 2021 : X-ray fluorescence

**More than 300 users per year**

**Around 20 engineers work together to make CMTC useful and successful**



## Training

**Phelma (graduate schools of engineering, Applied Physics, Electronics and Materials Science)**

**IMEP-2 Doctoral college of Grenoble University**

« **Classes découvertes Ingénieur** »

« **Fête de la Science...** »

## Continuing Education

**Training session combining theory and practice**

**Customized training**

- Microscopie électronique à balayage et microanalyse X
- Spectrométrie à dispersion de longueur d'onde (WDS)
- Microscopie électronique en transmission (MET)
- Caractérisation des couches minces par rayons X -  
collaboration INSTN – Grenoble INP

## Valorization

### How to collaborate

CMTC offers a range of comprehensive solutions to serve the characterization needs of its clients, by :

- Offering access to characterization via research programmes,
- Offering access to characterization resources after training,
- Providing characterization services to companies



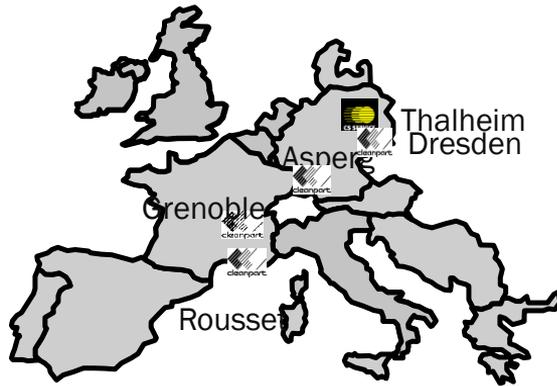
cleanpart

A Group Company of  MITSUBISHI  
CHEMICAL

**With thanks for support from Olivier Marchand (Cleanpart)**

# Cleanpart Profile

- Private company
- Surface technology and maintenance services
- Core business: semiconductor components processing for all fab technologies, Etch, Implant, PVD, CVD, Photo, CMP, Sub-Fab
- 500 employees including 30 engineers
- 9 Semiconductor service locations in US and Europe
- Servicing 300 mm & 200 mm fabs worldwide



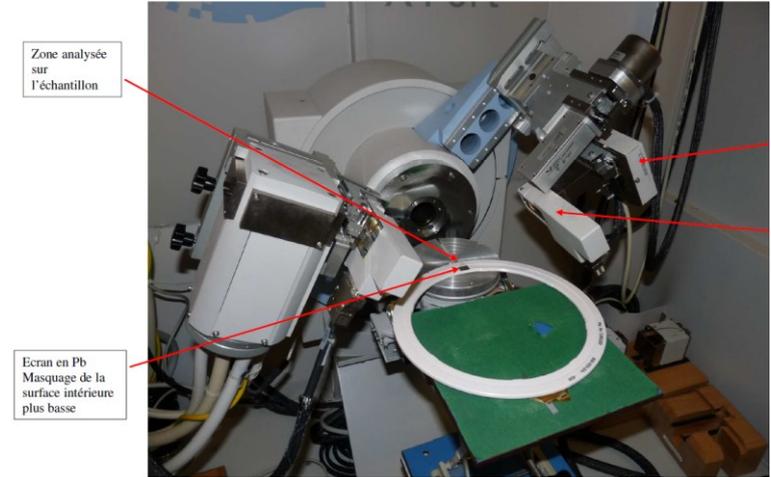
# Cleanpart-CMTC Partnership: Failure analysis

Problem statement : some produced Magnesia Stabilized Zirconia parts had the dimensions changed over time during process and recycling

As a results: rejected parts and customer process stopped (huge impact)

XRD analyses by CMTC :

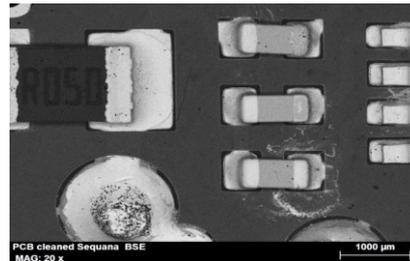
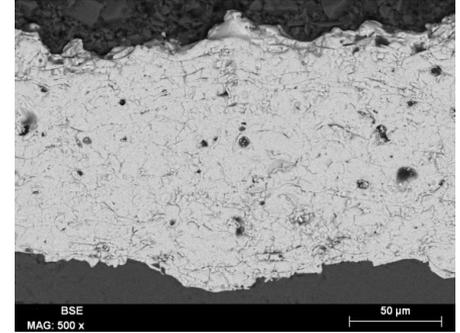
	#424 before thermal cycle	#424 after thermal cycle	#365 after thermal cycle
Tetragonal ZrO <sub>2</sub>	52%	20%	19%
Monoclinic ZrO <sub>2</sub>	28%	68%	68%
Cubic Zr <sub>(1-x)</sub> Mg <sub>x</sub> O <sub>2</sub>	20%	12%	13%



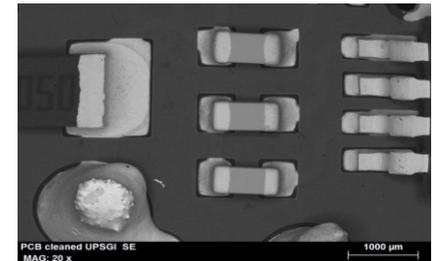
➤ Raw material was not properly stabilized by supplier

# Cleanpart-CMTC Partnership: Analyses for processes or products development

- SEM analysis for coating development
- SEM analysis for cleaning optimization (medical app)



Before cleaning  
Cl and organic  
contamination



After cleaning  
optimization : no more Cl  
and less organics





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On site visits are available

Crédits photos : CMTC, Grenoble INP - Alexis Chézières

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# Thank you for your attention

Hope to see you soon on the CMTC platform

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