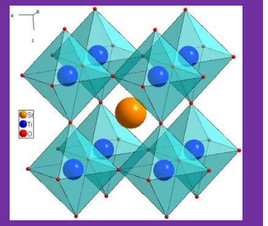

Careers involvement

Under or Post – graduate students may contact the project coordinator for thesis subjects

Future Events

• The next project meeting will take place in Lower Saxony, Germany in June 2013, hosted by Clausthal University of Technology

The meeting will follow a public presentation of the project and a press conference.

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SEMESTER BULLETIN ON PROJECT UPDATE

TheBarCode Newsletter

In this issue

AIM

TheBarCode will advance the efficiency of power generation in gas turbine processes by the development of advanced parts of significantly improved performance and software providing optimized process parameters.

Development of multifunctional Thermal Barrier Coatings and modelling tools for high temperature power generation with improved efficiency

TheBarCode addresses the following scientific and technological issues, which shall offer significant impact concerning successful implementation of energy efficient high temperature generation units.

- New TBC formulations with long-term stability, more resistant under extremely severe operating conditions (e.g. creep, fatigue, thermal-mechanical fatigue, oxidation and their interactions) thus the maximum application temperature will be longer, leading to higher performance during energy generation.
- Flexible and cost effective production systems based on thermal spray in order to realize patterned functional TBCs with improved properties.
- Application of structural analysis, fracture mechanics and Computational Fluid Dynamics (CFD) including heat transfer, fluid-structure interactions and conjugate heat transfer models for the development of detailed models for the operational performance and prediction of spallation and failure.
- Environmentally friendly process using chemical formulations free of hazardous and toxic solvents.
- Standardised thermo-mechanical, tribological and coating adhesion testing including thermal shock testing in extreme conditions (at a rate up to 70°C/second)

www.thebarcode.eu

Partnership

Technological Educational Institute of Chalkida (**TEIC**)	Greece
Boreskov Institute of Catalysis (**BIC**)	Russia
Clausthal University of Technology (**TUC**)	Germany
Powder Metallurgy Institute (**PMI**)	Belarus
Institute for Physical Research (**IPR**)	Armenia
Plasma Jet s.r.l. (**PLASMA**)	Romania
MERL Ltd (**MERL**)	United Kingdom
National Institute for Aerospace Research "Elie Carafoli"(**INCAS**)	Romania
MIRTEC S.A	Greece
NUMECA International S.A (**NUMECA**)	Belgium
Open Source Management (**OSM**)	United Kingdom

Project Implementation

The logical path of implementation of the project can be outlined in four interrelated phases:

A. ***Materials synthesis and testing***: i) development of top coat materials and wet or dry formulations suitable for topcoats deposition, ii) development of bond coat materials (including functional diffusion barriers)

B. ***Coatings development, fabrication and testing***: i) Application and optimization of dry deposition methodology for the new materials, ii) Application and optimization of wet deposition methodology for the new formulations, iii) Development of smart coatings of tunable nano and microstructure (graded)

A. ***Development of models and prediction tools***: i) Numerical modelling of the TBCs performance focused on experimental and theoretical parameters, ii) Computational Fluid Dynamics based optimization and energy efficiency assessment, iii) Service lifetime prediction tools (based on CFD and fracture and wear modelling)

B. ***Assessment of Technology***: Assessment of product (materials and coatings), process (deposition technology) efficiency, sustainability and cost & performance effectiveness upon application, for the entire life-time of the project; feedback (where necessary) to facilitate the decision making process.

The total duration of the project is 36 months. During the first stage of the project (month 1- 18), **new materials and their coatings will be used to develop the optimized coatings and protocols and start up models**. These materials and methods will meet the requirements and industrial interest of the end user partner of **THEBARCODE**. The second stage (month 15 – 36) will focus on the tuning, implementation and transfer of the methodologies (TBCs, models) to the application (real parts & units, energy efficiency).

The project is implemented from 1/1/2013 until the 31/12/2015