

## 7<sup>th</sup> Framework Programme Dissemination Workshop

### CERamic heat EXchangers with enhanced materials PROperties

VDMA, Frankfurt  
Germany  
March 22, 2013

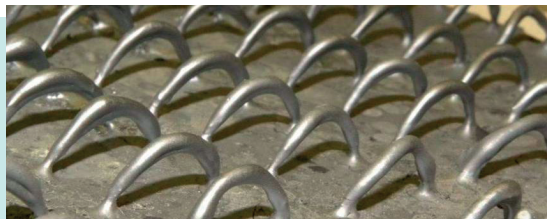


Heat recovery from waste gas is a major key process for increasing efficiency of thermal processes. The aim of the present work is to increase heat transfer coefficients of ceramic heat exchangers of recuperative burners using highly structured surface elements created from a textile precursor. This workshop explains the chosen geometries and their thermal behavior, the ceramization process and the preliminary design of the new recuperative burners and further application in industrial environment. Numerical and experimental results illustrating the performance of the new heat exchangers will be presented.

The workshop will be an interdisciplinary, intermediate-size research meeting on heat recovery from waste gas.

Registration is now open.

The workshop will bring together major experts and promising young researchers in the fields of heat exchangers and thermo process technology. It will be held in a setting highly suitable for scientific discussion with active interaction in relatively small groups.



#### Venue

VDMA  
Lyoner Str. 18  
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Conference room 1 (ground floor)

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# INTRODUCTION

Heat recovery at a high temperature level is essential in industrial thermo processing. With the use of ceramic materials in the thermal process, the possibility exists to yield higher temperature levels and subsequently, higher thermal recovery efficiencies. The aim of CEREXPRO, a project funded by the European commission, is to develop a new generation of ceramic heat exchangers for high temperature heat recovery with the target of significantly reducing the size and weight of the exchanger components while reducing the price of such components through simplifying the manufacturing process and allowing higher flexibility in heat exchanger geometry.

The use of precursor/template materials taken from the textile industries and a subsequent ceramic conversion is the main technological path proposed to reach these objectives. Although the principal idea is not new, there are no known efforts into the development of such technology for the utilization of such an approach for industrial high temperature heat exchangers.

This project will lead to an increase in the freedom of the heat exchanger geometric design with lowered costs for shaping. The development/refinement of the conversion process for such materials into a thermal-shock resistant gas-tight ceramic (e.g. silicon infiltrated silicon carbide - SiSiC) and the optimization in terms of size, geometry, material, and production costs is the major challenge of this project.

This can be reached by a combination of existing robust ceramic components already applied in industrial furnaces, like SiSiC tubes, with compatible ceramic heat exchanger elements built through the textile technology based manufacturing process. This leads to a high application safety.

Simultaneously, a significant size reduction or, alternatively, an increase of the heat recovery level can be achieved due to the higher heat transfer of the found geometrically flexible heat exchange elements.

# AGENDA

<b>Chair</b>	<b>Professor Dimosthenis Trimis</b> TU Bergakademie Freiberg, Germany	<b>12:10</b>	<b>Application of textiles on ceramic bodies, Conversion to ceramics</b> Professor Alberto Ortona, Scuola Universitaria Professionale della Svizzera Italiana, Switzerland
<b>10:00</b>	<b>Welcome and introduction to the project</b> Professor Dimosthenis Trimis, TU Bergakademie Freiberg, Germany	<b>12:30</b>	<b>Integration of highly structured ceramic recuperators into industrial burners</b> Tobias Grämer, Noxmat GmbH, Germany
<b>10:15</b>	<b>Thermoprocessing plants – an introduction</b> Dr. Franz Beneke, VDMA e.V., Germany	<b>13:00</b>	<b>Summary, further steps and perspectives Open discussion</b> Professor Dimosthenis Trimis, TU Bergakademie Freiberg, Germany
<b>10:30</b>	<b>Market study burners with integrated air preheating</b> Mike Debier, Past President, CECOF - The European Committee of Industrial Furnace and Heating Equipment Associations, Germany	<b>13:30</b>	<b>Lunch</b>  <b>Open discussion</b> Professor Dimosthenis Trimis, TU Bergakademie Freiberg, Germany
<b>10:50</b>	<b>The project – idea, structure, way of solution</b> Dr. Volker Uhlig, TU Bergakademie Freiberg, Germany	<b>15:00</b>	<b>End of workshop</b>
<b>11:10</b>	<b>Surface structuring of ceramic heat exchangers Numerical and experimental investigation</b> Robert Eder, TU Bergakademie Freiberg, Germany		
<b>11:30</b>	<b>Coffee break</b>		
<b>11:50</b>	<b>Textile structures as template for structured ceramics: fibers, fabrics and production processes</b> NN, Institut Français du Textile et de l’Habillement, France		

