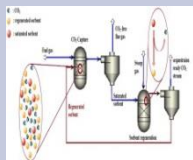




Department of Chemical Engineering  
Laboratory of Petrochemical Technology  
Director: Prof. Angeliki Lemonidou

Materials and  
energy related  
processes



Post combustion  
CO<sub>2</sub> capture in  
cement plants

H<sub>2</sub>

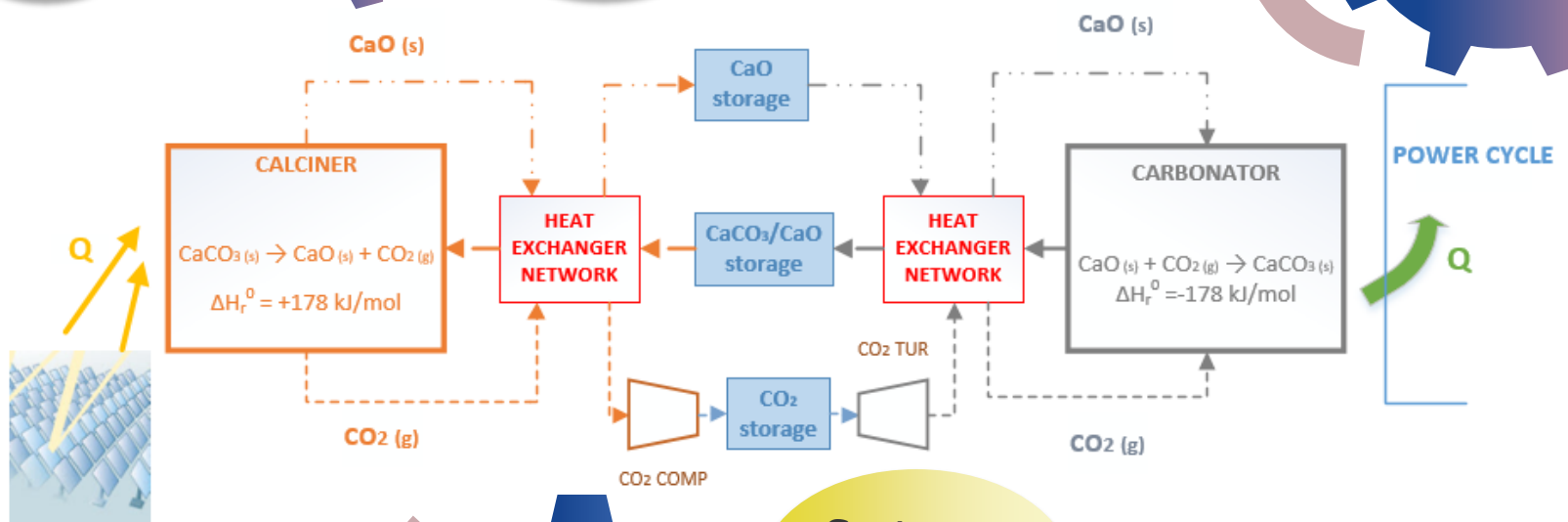
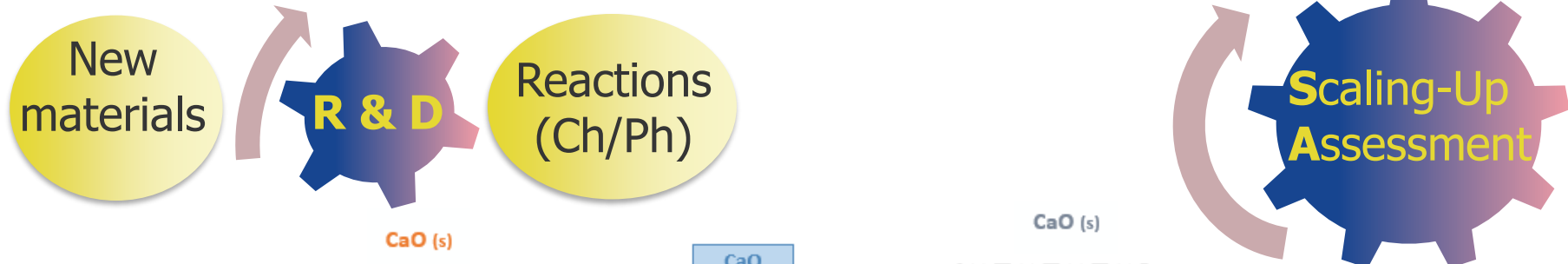
Hydrogen  
production (with  
in situ CO<sub>2</sub>  
capture)

 **CRATCES**

Heat storage via  
thermochemical  
cycles

*email: [alemonidou@cheng.auth.gr](mailto:alemonidou@cheng.auth.gr)  
<http://LPT.cheng.auth.gr>*

# Technical Approach



# Intensifying methane reforming by combining carbonate and chemical looping

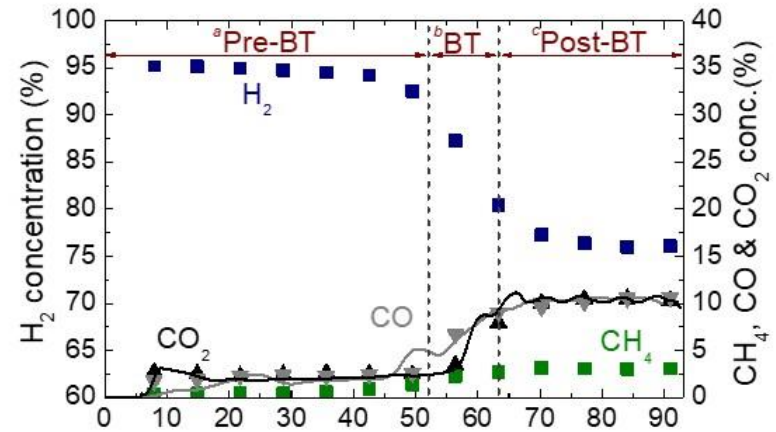
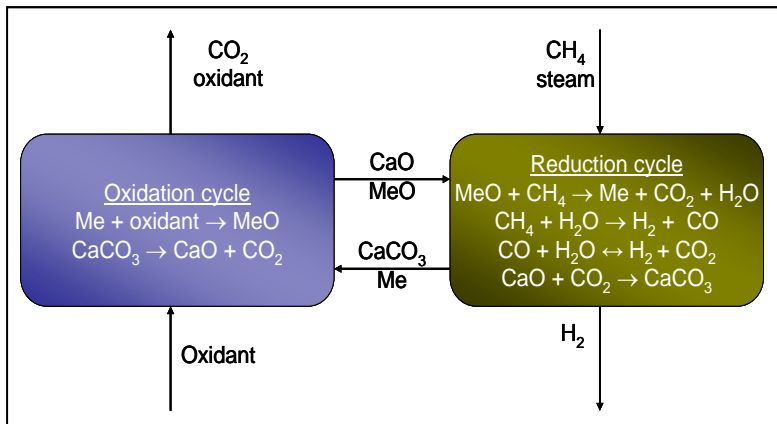


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TEXAS A&M  
UNIVERSITY at QATAR

- NPRP 5-420-2-166 ", Qatar National Research Fund
- Coordinator: A. Lemonidou, 2013-2017



## Objectives

- Development of CaO-based CO<sub>2</sub> sorbents and NiO-based oxygen transfer materials
- Proof of concept of chemical looping sorption enhanced methane reforming
- Kinetic modeling of the reaction network
- Conceptual design of H<sub>2</sub> production unit

A. Antzara, E. Heracleous, D.B. Bukur, A.A. Lemonidou, *International Journal of Greenhouse Gas Control* 32 (2015) 115

L. Silvester, A. Antzara, G. Boskovic, E. Heracleous, A. A. Lemonidou, D. B. Bukur, *Int. J. Hydrogen E*, 40 (2015) 7490

A. Antzara, E. Heracleous, A.A. Lemonidou, *Applied Energy*, 156 (2015) 331

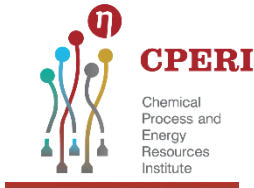
A. Antzara, E. Heracleous, A.A. Lemonidou, *Applied Energy*, 180 (2016) 457

# Novel intensified processes for CO<sub>2</sub> capture and conversion to methanol



Aristotle University  
of Thessaloniki

**SimTec**  
Software & Services



European Union  
European Regional  
Development Fund

**ΕΡΑΝΕΚ 2014-2020**  
OPERATIONAL PROGRAMME  
**COMPETITIVENESS  
ENTREPRENEURSHIP  
INNOVATION**



Co-financed by the European Union and Greek national funds

Coordinator: Prof. Angeliki Lemonidou, AUTH, Project: T1ΕΔΚ-01532, 2018-2021

## Objectives

- Development of catalysts and H<sub>2</sub>O sorbents
- Optimization of CaO and MgO based sorbents
- Pilot scale testing
- Kinetic and reactor modeling
- Design, techno-economic and environmental assessment of the integrated CO<sub>2</sub> capture and conversion processes integrated in the AGET cement production plant

