Project Title	Integrated management and exploitation of multi-dispersed agricultural residues – application to energy production		
Acronym	SYNAGRON	Project Coordinator	Prof. Vagelis G. Papadakis
Organization	Khalifa University of Science and Technology (KUST), Department of Mechanical Engineering (United Arab Emirates), Associate Professor KYRIAKI POLYCHRONOPOULOU		

The newly-established **Khalifa University of Science and Technology** (KUST) combines The Masdar Institute of Science and Technology, Khalifa University of Science, Technology and Research and The Petroleum Institute into one **world-class, research-intensive institution**. It endeavors to be a leader among research intensive universities of the 21st century, while catalyzing the growth of Abu Dhabi and the UAE's rapidly developing knowledge economy. **KUST** has consistently ranked among the **best 100 universities in Asia**, while according to the Times Higher Education Asia University Rankings it has jumped 44 places and **reached 32nd position in 2018**. KUST boasts **12 dedicated research centers** exploring a diverse range of energy, water, aerospace, **catalysis** and information and communication technology challenges, over **50 central laboratories** with state-of-the-art equipment investigating subjects ranging from artificial intelligence and robotics to **clean energy**, hydrocarbons and aerospace and **3 major demonstration facilities** for solar energy, sustainable buildings and **bioenergy**. KUST participates in the project proposed herein through the Department of Mechanical Engineering and its Assoc. Prof. Kyriaki Polychronopoulou.

Dr **Kyriaki Polychronopoulou** is currently Assoc. Prof. of Mechanical Engineering at Khalifa University of Science and Technology (KUST) in the United Arab Emirates (UAE), and Visiting Professor at **ETH-Zurich**. She holds a PhD in Chemistry from the University of Cyprus (2005). During her professorship she received the **Advanced Award for Research Excellence** from the Abu Dhabi Educational Council (ADEC) in two consecutive rounds (2015 and 2017). Before her appointment at KUST, she was **Postdoctoral Fellow at Northwestern University**. She is a recipient of a **2007 Fulbright Award for Advanced Research** and a **2008 British Council Award** in the context of which she worked at the **University of Illinois at Urbana-Champaign** (IL, USA) and **National Physical Laboratory** (London, UK), respectively. Her research is focused on the development of catalytic materials for phenol steam reforming, water gas shift and CO oxidation reactions as well as in the application of porous materials for H_2 storage, CO_2 capture and gases separations. She has extensive experience in microstructural characterization of surfaces using diffraction, microscopy and spectroscopy tools. Dr **K. Polychronopoulou** has authored more than **80 peer-reviewed scientific articles**, has over **1400 citations** and an **h-index of 23**. In addition, she has contributed in over 100 international conferences. **Since 2016, Dr. K. Polychronopoulou enjoys an ever closer collaboration with Prof. Maria A. Goula from TEIWM (as evidenced by their common publications), but also with the Coordinator of the project proposed herein, V.G. Papadakis. In particular, K. Polychronopoulou is a member of the tripartite advisory committee for a Ph.D. candidate that is supervised by Prof. V.G. Papadakis (the third member is Prof. M.A. Goula).**

INDICATIVE R&D PROJECTS:

01/2018 – 12/2019	**Project title:** *"*Novel Design Strategies of Bimetallic Nano-catalysts for Enhanced Dry Reforming of Methane (DRM) Performance towards Synthesis Gas Production*"*, **Funded by:** ADEC 2017, **Value (€):** 65.000**, Position:** Principal Investigator (PI).
01/2015 – 12/2017	**Project title:** *"*A CO-free H_2 fuel by Coupling WGS and CO Oxidation Reactions in a Single Reactor Towards Enhancing Fuel Cell Technology (Process Intensification)*"*, **Funded by:** ADEC 2015, **Value (€):** 90.000**, Position:** PI.
01/2015 – 12/2016	**Project title:** *"Catalytic Conversion of Carbon Dioxide into Methanol Using Advanced NanoPorous Covalent Organic Polymers"*, **Funded by:** KAIST-KU Award 1015 & 2016, **Value (€):** 160.000**, Position:** PI.

DESCRIPTION OF KUST EQUIPMENT TO BE USED IN THE PROJECT PROPOSED HEREIN:

A 3Flex Surface Area and Pore Size Analyser system (Micromeritics, USA) will be used to measure **the surface area and porosity** (BET surface area, m^2/g) and **pores size distribution** (BJH plots) of the materials. An Autochem 2920 (Micromeritics, USA) will be used for the **Temperature-Programmed Reduction** (TPR) and **Desorption** (TPD) techniques (TPR-H_2, TPD-NH_3, TPD-CO_2 etc.). Moreover, in-situ diffuse reflectance infrared transform spectroscopy (in situ DRIFTs) analysis will be applied in order to study the ***chemical structure and thermal stability of adsorbed surface carbonates***. A Perkin-Elmer Spectrum GX II FTIR spectrometer equipped with a HT/HP controllable DRIFTS cell (Harrick, Praying Mantis) will be used for performing in **situ DRIFTS-CO_2 chemisorption studies**.

SELECTED LIST OF PUBLICATIONS IN PEER REVIEWED INTERNATIONAL JOURNALS:

- Charisiou N.D., Siakavelas G., Tzounis L., Sebastian V., Monzon A., Baker M.A., Hinder S.J., **Polychronopoulou K.**, Yentekakis I.V., **Goula M.A.**, "Insights into the carbon formation during dry reforming of biogas over CeO_2 and La_2O_3-modified Ni/ZrO_2 catalysts". *Chem Eng J* – under review.
- Charisiou N.D., Siakavelas G., Papageridis K.N., Sebastian V., Hinder S.J., Baker M.A, **Polychronopoulou K.**, **Goula M.A.**, "The influence of SiO_2 doping on the Ni/ZrO_2 supported catalyst for hydrogen production through the glycerol steam reforming reaction". *Catal Today* – under revision.
- Charisiou N.D., Tzounis L., Sebastian V., Baker M.A., Hinder S.J., **Polychronopoulou K.**, **Goula M.A.**, "Investigating the correlation between deactivation and the carbon deposited on the surface of Ni/Al_2O_3 and Ni/La_2O_3-Al_2O_3 catalysts during the biogas reforming reaction". *Appl Surf Sci* – under revision.

1. Charisiou N.D., Iordanidis A., **Polychronopoulou K.**, Yentekakis I.V., **Goula M.A.**, "Studying the stability of Ni supported on modified with CeO_2 alumina catalysts for the biogas dry reforming reaction". *Mater Today: Proc* – Accepted for publication.
2. Charisiou N.D., Papageridis K.N., Tzounis L., Sebastian V., Baker M.A., Hinder S.J., AlKetbi M., **Polychronopoulou K.**, **Goula M.A.**, "Ni supported on CaO-MgO-Al_2O_3 as a highly selective and stable catalyst for H_2 production via the glycerol steam reforming reaction". *Int J Hydrogen Energ* – In press [link]
3. Charisiou N.D., Siakavelas G., Papageridis K.N., Baklavaridis A., Tzounis L., Goula G., Yentekakis I.V., **Polychronopoulou K.**, **Goula M.A.**, "The effect of WO_3 modification of ZrO_2 support on the Ni-catalyzed dry reforming of biogas reaction for syngas production". *Front Environ Sci*, 5 (**2017**) (article 66). [link]
4. Charisiou N.D., Papageridis K.N., Siakavelas G., Tzounis L., Kousi K., Baker M.A., Hinder S.J., Sebastian V., **Polychronopoulou K.**, **Goula M.A.**, "Glycerol steam reforming for hydrogen production over nickel supported on alumina, zirconia and silica catalysts". *Topic Catal*, 60 (**2017**) 1226-1250. [link]
5. Charisiou N.D., Siakavelas G., Papageridis K.N., Baklavaridis A., Tzounis L., **Polychronopoulou K.**, **Goula M.A.**, "Hydrogen production via the glycerol steam reforming reaction over nickel supported on alumina and lanthana-alumina catalysts". *Int J Hydrogen Energ*, 42 (**2017**) 13039-13060. [link]
6. Jaoude M.A., **Polychronopoulou K.**, Hinder S.J., Katsiotis M.S., Baker M.A., Greish Y.E., Alhassan S.M., "Synthesis and properties of 1D Sm-doped CeO_2 composite nanofibers fabricated using a coupled electrospinning and sol-gel methodology". *Ceramics Int*, 42 (**2016**) 10734-10744. [link]

Selected Publications in Peer Reviewed International Conference Proceedings:

1. Charisiou N.D., Siakavelas G., Papageridis K., Stavrou S., Latsiou A., Sebastian V., Hinder S.J., Baker M.A., **Polychronopoulou K.**, **Goula M.A.**, *"Investigating the correlation between deactivation and carbon deposition on Ni/Al_2O_3 and Ni/CaO-MgO-Al_2O_3 catalysts during the biogas reforming reaction"*. ANM2018, Aveiro, Portugal, July 18-20, **2018**.
2. Charisiou N.D., Siakavelas G., Papageridis K., Sebastian V., Hinder S.J., Baker M.A., **Polychronopoulou K.**, **Goula M.A.**, *"Hydrogen production through the glycerol steam reforming reaction: The influence of Y_2O_3 doping on Ni/ZrO_2 catalysts"*. ANM2018, Aveiro, Portugal, July 18-20, **2018**.
3. Charisiou N.D., Papageridis K.N., Sebastian V., Hinder S.J., Baker M.A., AlKhoori A., AlKetbi M., **Polychronopoulou K.**, **Goula M.A.**, *"Copper catalysts supported on ceria-samaria for the production of hydrogen via the glycerol steam reforming reaction"*. PREPA12, Louvain-La-Neuve, Belgium, July 8-12, **2018**.
4. Charisiou N.D., Papageridis K.N., Siakavelas G., Domopoulou A., Sebastian V., Hinder S.J., Baker M.A., **Polychronopoulou K.**, **Goula M.A.**, *"Synthesis of Ni/Al_2O_3 by poly(ethylene glycol) assisted sol-gel route as a highly efficient catalyst for the biogas reforming reaction"*. PREPA12, Louvain-La-Neuve, Belgium, July 8-12, **2018**.
5. Charisiou N.D., Siakavelas G., Papageridis K.N., Sebastian V., Hinder S.J., Baker M.A., **Polychronopoulou K.**, **Goula M.A.**, *"Hydrogen production via the steam reforming of glycerol using Ni supported on zirconia modified with Y_2O_3 catalysts"*. WHEC2018, Rio de Janeiro, Brazil, June 17-22, **2018.**
6. Charisiou N.D., Siakavelas G., Papageridis K.N., Sebastian V., Hinder S.J., Baker M.A., **Polychronopoulou K.**, **Goula M.A.**, "*Highly active and coke resistant Ni catalyst supported on CaO-MgO-Al_2O_3 for H_2 production via the biogas dry reforming reaction"*. WHEC2018, Rio de Janeiro, Brazil, June 17-22, **2018.**
7. Charisiou N.D., Papageridis K.N., Siakavelas G., Latsiou A., Sebastian V., **Polychronopoulou K.**, **Goula M.A.**, *"Hydrogen production via the glycerol steam reforming using nickel catalysts based on zirconia and zirconia modified with CeO_2 or La_2O_3"*. EHEC2018, Malaga, Spain, March 14-16, **2018**.
8. Charisiou N.D., Siakavelas G., Papageridis K.N., Tzounis L., Sebastian V., Baker M.A., Hinder S.J., **Polychronopoulou K.**, **Goula M.A.**, *"Nickel on alumina, zirconia and silica catalysts for the production of hydrogen via the biogas dry reforming reaction: Insights into carbon formation"*. EHEC2018, Malaga, Spain, March 14-16, **2018**.
9. **Polychronopoulou K.**, Charisiou N.D., **Goula M.A.**, *"Hydrogen production via the glycerol steam reforming reaction using nickel supported on alumina catalysts: The effect of the addition of basic modifiers"*, IWAM2018, U.A.E., February 18-20, **2018**.