

Dr. Konstantinos G. Kalogiannis graduated the Dept. of Chemical Engineering at Aristotle University of Thessaloniki (AUTH) in 2000. He obtained a Master degree in Processes and Technology of Advanced Materials (2002) and his Ph.D. in Chemical Engineering (2006) from the Aristotle University of Thessaloniki. Since 2007 he is a collaborating researcher in the Laboratory of Environmental Fuels and Hydrocarbons (LEFH) of the Chemical Process and Energy Resources Institute (CPERI) at the Centre for Research & Technology Hellas (CERTH). He is currently responsible for the lab and pilot plant units focused on biofuels and renewable chemicals production through the process of catalytic fast pyrolysis. His specialty areas focus on process development for biofuels and chemicals production through catalytic pyrolysis, hydrothermal treatment of biomass and catalyst deactivation in these processes. Dr. Kalogiannis is the co-author of 21 papers in peer reviewed, scientific journals, 50+ in international and national conference proceedings, and 3 book chapters, concerning hydrothermal and chemical depolymerisation and fractionation of biomass, heterogeneous catalysis and biomass-to-fuels & chemicals pyrolysis process. He has actively participated in several extended European research consortiums and National research projects. In addition, he has worked with major international refineries, catalyst and biofuels production companies for catalyst and process testing. His published work has been worldwide acknowledged with more than 400 citations. He is currently supervising a PhD thesis on the Catalytic pyrolysis for biofuels production and has also supervised several Diploma and Training Thesis from the Chemical Engineering Department AUTH and the Department of Petroleum and Natural Gas Technology, KAVTECH dealing with Heterogeneous Catalytic Pyrolysis of Biomass.

### RESEARCH FIELDS OF INTEREST

**Catalytic and Thermal Pyrolysis of Biomass** Development of process for energy and renewable chemicals production

#### **Bench scale testing**

Screening of heterogeneous catalysts and feeds in bench scale unit. Process parameters evaluation.

#### **Pilot scale testing**

Biomass catalytic pyrolysis in pilot scale allowing mass balances production, process development for commercial scale, production of higher amounts of biooils for complete characterization and further upgrading.

#### **Catalyst deactivation testing**

Development of unit and process for catalyst deactivation evaluations in the process of biomass pyrolysis.

#### **Hydrothermal treatment of biomass process**

Hydrothermal and organic solvent treatment for biomass fractionation and platform chemicals production. Heterogeneous catalysis evaluation for selectivity and efficiency enhancement.

### HIGHER EDUCATION

**2007 –** Collaborating Researcher in CPERI/CERTH

**2002 – 2006** PhD in Chemical Engineering, Department of Chemical Engineering, AUTH

**PhD Thesis:** *“Use of Supercritical Fluids for the Treatment of Biodegradable Polymers and Pharmaceutical Compounds”*

**2001 – 2002** Master in Processes and Technology of Advanced Materials, Department of Chemical Engineering, AUTH

**Master Thesis:** *“Design and Implementation of a Lab-Scale Unit for the Production of Microparticles with the Help of Supercritical Fluids and Study of the Effect of the Process Parameters on the Characteristics of the Microparticles”*

**1995 – 2000** Diploma in Chemical Engineering, Department of Chemical Engineering, AUTH

### REVIEWER IN SCIENTIFIC JOURNALS

1. Journal of Analytical and Applied Pyrolysis
2. Waste and Biomass valorization
3. RSC advances

## PUBLICATIONS IN SCIENTIFIC PEER-REVIEWED JOURNALS

1. Tsivintzelis, D. Missopolinou, **K. Kalogiannis**, C. Panayiotou, “Phase compositions and saturated densities for the binary systems of carbon dioxide with ethanol and dichloromethane” *Fluid Phase Equilibria*, 2004, 224, 89–96
2. **Kalogiannis, C. G.**; Panayiotou, C. G. “Bubble and Cloud Points of the System Poly(L-lactic acid) + Carbon Dioxide + Dichloromethane” in *J. Chem. Eng. Data*; 2005; 50(4); 1442-1447
3. **Kalogiannis, C. G.**; Pavlidou, E.; Panayiotou, C. G. “Production of Amoxicillin Microparticles by Supercritical Antisolvent Precipitation” in *Ind. Eng. Chem. Res.*; 2005; 44(24); 9339-9346
4. **Kalogiannis, C. G.**; Panayiotou, C. G. “Bubble and Cloud Points of the Systems Poly( $\epsilon$ -caprolactone) + Carbon Dioxide + Dichloromethane or Chloroform” in *J. Chem. Eng. Data*; 2006; 51(1); 107-111
5. **Kalogiannis, C. G.**; Michailof C.M.; Panayiotou, C. G. “Microencapsulation of Amoxicillin in Poly(L-lactic acid) by Supercritical Antisolvent Precipitation” in *Ind. Eng. Chem. Res.*; 2006; 45 (26); 8738-8743
6. Stephanidis S., Nitsos C., **Kalogiannis K.**, Iliopoulou E.F., Lappas A.A., Triantafyllidis K.S., Catalytic upgrading of lignocellulosic biomass pyrolysis vapours: Effect of hydrothermal pre-treatment of biomass, *Catalysis Today* 167 (1), pp. 37-45, 2011
7. S.D. Stefanidis, **K.G. Kalogiannis**, E.F. Iliopoulou, A.A. Lappas, P.A. Pilavachi, In-situ upgrading of biomass pyrolysis vapors: Catalyst screening on a fixed bed reactor, *Bioresource Technology* Volume 102, Issue 17, Pages 8261-8267, 2011
8. Buana Girisuta, **Konstantinos G. Kalogiannis**, Karla Dussan, James J. Leahy, Michael H. B. Hayes, Stylianos D. Stefanidis, Chrysa M. Michailof and Angelos A. Lappas. An Integrated Process for the Production of Platform Chemicals and Diesel Miscible Fuels by Acid-Catalyzed Hydrolysis and Downstream Upgrading of the Acid Hydrolysis Residues with Thermal and Catalytic Pyrolysis. *Bioresource Technology* (2012) 126, 92–100.
9. E.F. Iliopoulou, S.D. Stefanidis, **K.G. Kalogiannis**, A. Delimitis, A.A. Lappas and K.S. Triantafyllidis. Catalytic upgrading of biomass pyrolysis vapours using transition metal-modified ZSM-5 zeolite. *Applied Catalysis B: Environmental* (2012), 127, 281-290.
10. S. Stefanidis, **K. Kalogiannis**, E. F. Iliopoulou, A. A. Lappas, J. Martínez Triguero, M. T. Navarro, A. Chica and F. Rey. Mesopore-modified mordenites as catalysts for catalytic pyrolysis of biomass and cracking of vacuum gasoil processes. *Green Chem.*, 2013, 15, 1647.
11. E.F. Iliopoulou, S. Stefanidis, **K. Kalogiannis**, A.C. Psarras, A. Delimitis, K.S. Triantafyllidis and A.A. Lappas, 2014. Pilot-scale validation of Co-ZSM-5 catalyst performance in the catalytic upgrading of biomass pyrolysis vapours. *Green Chemistry* 16, 662-674.
12. Stefanidis, S.D., **Kalogiannis, K.G.**, Iliopoulou, E.F., Michailof, C.M., Pilavachi, P.A., Lappas, A.A., 2014. A study of lignocellulosic biomass pyrolysis via the pyrolysis of cellulose, hemicellulose and lignin. *Journal of Analytical and Applied Pyrolysis* 105, 143–150.
13. C. Michailof, T. Sfetsas, S. Stefanidis, **K. Kalogiannis**, G. Theodoridis, A. Lappas, Quantitative and qualitative analysis of hemicellulose, cellulose and lignin bio-oils by comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry, *J. Chromatogr. A* (2014), <http://dx.doi.org/10.1016/j.chroma.2014.10.020>
14. E.V. Antonakou, **K.G. Kalogiannis**, S.D. Stephanidis, K.S. Triantafyllidis, A.A. Lappas, D.S. Achilias, Pyrolysis and catalytic pyrolysis as a recycling method of waste CDs originating from polycarbonate and HIPS, *Waste Management* 34 (2014) 2487–2493
15. E.V. Antonakou, **K.G. Kalogiannis**, S.D. Stefanidis, S.A. Karakoulia, K.S. Triantafyllidis, A.A. Lappas, D.S. Achilias, Catalytic and thermal pyrolysis of polycarbonate in a fixed-bed reactor: The effect of catalysts on products yields and composition, *Polymer Degradation and Stability* 110 (2014) 482–491
16. N. Thegarid, G. Fogassy, Y. Schuurman, C. Mirodatos, S. Stefanidis, E.F. Iliopoulou, **K. Kalogiannis**, A.A. Lappas, Second-generation biofuels by co-processing catalytic pyrolysis oil in FCC units, *Applied Catalysis B: Environmental*, Volume 145, February 2014, Pages 161–166
17. E. F. Iliopoulou, S. Stefanidis, **K. Kalogiannis**, A. C. Psarras, A. Delimitis, K. S. Triantafyllidis and A. A. Lappas, Pilot-scale validation of Co-ZSM-5 catalyst performance in the catalytic upgrading of biomass pyrolysis vapours, *Green Chemistry* 16 (2014), 662-674
18. **Kalogiannis, K.G.**, Stefanidis, S.D., Michailof, C.M., Lappas, A.A., Sjöholm, E., Pyrolysis of lignin with 2DGC quantification of lignin oil: Effect of lignin type, process temperature and ZSM-5 in situ

upgrading, *Journal of Analytical and Applied Pyrolysis* Volume 115, 1 September 2015, Pages 410-418

19. **Kalogiannis, K.G.**, Stefanidis, S., Marianou, A., Michailof, C., Kalogianni, A., Lappas, A., *Lignocellulosic Biomass Fractionation as a Pretreatment Step for Production of Fuels and Green Chemicals, Waste and Biomass Valorization*, Volume 6, Issue 5, 29 October 2015, Pages 781-790

20. Stefanidis, S.D., Heracleous, E., Patiaka, D.T., **Kalogiannis, K.G.**, Michailof, C.M., Lappas, A.A., *Optimization of bio-oil yields by demineralization of low quality biomass, Biomass and Bioenergy*, Volume 83, December 01, 2015, Pages 105-115

21. Vasalos, I.A., Lappas, A.A., Kopalidou, E.P., **Kalogiannis, K.G.**, *Biomass catalytic pyrolysis: Process design and economic analysis, Wiley Interdisciplinary Reviews: Energy and Environment*, 2016

#### TEN SELECTED PUBLICATIONS IN SCIENTIFIC CONFERENCES

1. **K. Kalogiannis**, Lambrou Ch, Y.-W. Lee, and C. Panayiotou “Paracetamol micronisation by precipitation with supercritical carbon dioxide with the SAS and SEDS process – influence of process parameters”, *Proceedings of the 6th International Symposium on Supercritical*, Versailles, France, 2003

2. A.A. Lappas, V. Dimitropoulos, E. Antonakou, **K. Kalogiannis** “Catalytic biomass pyrolysis in a transported fluid bed pilot plant unit for the production of biooil with improved quality” *Proceedings of 16th European Biomass Conference and Exhibition*, Valencia, Spain, 2008

3. S.D. Stephanidis, C. Nitsos, **K. Kalogiannis**, E. Iliopoulou, A. Lappas, K Triantaphillidis “Catalytic pyrolysis of Hydrothermally pretreated Lignocellulosic biomass” *Cost Action CM0903 (UBIOCHEM) 1st Workshop*, Cordoba, Spain, 13 – 15 May 2010

4. **K.G. Kalogiannis**, S.D. Stephanidis, S.S. Voutetakis, A.A. Lappas, “In situ catalytic upgrading of biooil with novel and commercial catalysts, from bench to pilot plant scale” *AICHE*, Salt Lake City, USA, 7 – 12 November 2010

5. Eleni F. Iliopoulou, Stelios Stefanidis, **Kostas Kalogiannis**, Angelos A. Lappas and Kostas S. Triantafyllidis, *Catalytic upgrading of biomass pyrolysis vapours using transition metal-modified ZSM-5 zeolite*, August 28th - Sep. 2nd, 2011 – *EuropaCat X*

6. **K. Kalogiannis**, S. Stefanidis, A.A. Lappas, M. Stöcker, L. Hannevold and Aud I. Spjelkavik, Fredrik Öhman, *Catalytic Pyrolysis of Lignin for the production of high added value chemicals and fuels*, NWBC, Stockholm, Sweden, 22-24 March, 2011

7. E.F. Iliopoulou, S. Stephanidis, **K. Kalogiannis**, A.A. Lappas and K.S Triantafyllidis, *Catalytic pyrolysis of biomass pyrolysis vapours using transition metal-based catalysts: Effect of metal type, loading and oxidation state,* ” *Cost Chemistry – D36 Structure performance relationships at the surface of functional materials Conference*, Fuengirola, Spain, 17-20 May, 2011

8. N. Thegarid, G. Fogassy, Y. Schuurman, C. Mirodatos, S. Stefanidis, E. F. Iliopoulou, **K. G. Kalogiannis**, A. A. Lappas, *Tomorrow’s biofuel: bio-gasoline production in FCC unit*, 8th ECCE, 25-29 September 2011, Berlin, Germany

9. **K.G. Kalogiannis**, S.D. Stefanidis, C. Michailof, A.A. Lappas. *Downstream Valorisation of Acid Hydrolysis Residues via Thermal and Catalytic Pyrolysis. International Conference “Biofuels for Sustainable Development of Southern Europe”* Thessaloniki, Greece 19-20 November 2012

10. **K.G. Kalogiannis**, S.D. Stephanidis, C. Michailof, A.A. Lappas. *Production of upgraded bio-oils from miscanthus acid hydrolysis residues by catalytic pyrolysis – Effect of feed and acid hydrolysis conditions. CAT4BIO Conference “Advances in Catalysis for Biomass Valorization”, July 8-11, 2012 Thessaloniki-Greece.*

#### CHAPTERS IN BOOKS

1. “**Conversion of biomass to fuels and chemicals via thermochemical processes**” A.A.Lappas, E. Iliopoulou, K.Kalogiannis, S.Stefanidis, *Utilization of Biomass for the Production of Chemicals or Fuels. The Concept of Biorefinery comes into Operation*. Ed. De Gruyter in press.

2. “**Catalytic Pyrolysis of Biomass**” A.A.Lappas, E. Iliopoulou, K.Kalogiannis, K.S. Triantafyllidis, *Processes of production and energy utilization of gas, liquid and solid biofuels. Panhellenic Association of Chemical Engineers, Department of Central and Western Macedonia*, 2012.

3. “**Catalysts in Biomass Pyrolysis**”, A.A. Lappas, E.F. Iliopoulou and K. Kalogiannis in “*Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals*”, Ed. Mark Crocker, RSC Publishing Eds. 2010.

## **PUBLICATIONS**

The research outcome of Dr. Kalogiannis is published in 21 papers in peer reviewed, scientific journals, in 50+ national and international conference proceedings, and 3 book chapters, concerning heterogeneous catalysis, catalyst deactivation catalytic and thermal pyrolysis of biomass for the production of fuels and platform chemicals, hydrothermal treatment of biomass and high pressure supercritical fluids processes. Citations are in excess of 400+ and the h-index is currently at 12.