



National Centre for Scientific Research Demokritos
Institute of Nanoscience and Nanotechnology
Materials and Membranes for Energy and
Environmental Separations Laboratory (MESL)



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MESL was founded in 1989 and has currently 10 permanent researchers and more than 15 postdoctoral fellows and PhD students. The laboratory's main aim is research and development of porous and composite materials and membranes for environmental, energy and health applications. The expertise lies mainly on the development, characterization, simulation and assessment of materials and processes. MESL has also extensive experience in coordinating and participating in European and National research projects from which it has attracted more than 10Meuro.

More specifically, the fields of interest include:

- Preparation and characterization of polymers and polymer nanocomposites with improved barrier properties for packaging applications.
- Preparation and characterization of hybrid nano-composite materials for energy (e.g. fuel cell) applications.
- Preparation of coatings for marine and aviation applications as well as powder coatings
- Synthesis of hybrid nano-composite membranes and materials (Ionic Liquids/ceramic substrate nanocomposites) for CO₂ capture and/or separation
- Development, modification and optimization of porous materials and membranes (including hollow fibers), filters and membrane systems for gas and liquid phase separations, gas storage and controlled release applications
- Synthesis and characterization of supported metal nanoparticles for heterogeneous catalytic applications including deNO_x, CO oxidation, CH₄ WGS reaction and HC reforming.
- Pore structure and surface chemistry characterization of porous materials (adsorption/desorption of probe molecules, multiple base titration, temperature programmed desorption – mass spectroscopy (TPD-MS))

In the field of polymeric packaging testing MESL has extensive infrastructure and know-how for detailed characterization.

Examples include:

a) Surface characterization

1. Scanning Electron Microscopy
2. Atomic Force Microscopy
3. Contact angle measurements

b) Barrier properties

1. Oxygen permeability
2. Water/moisture permeability
3. Organic vapor/gas permeability (eg carbon dioxide, benzene, methanol etc)

c) Thermal properties

1. Differential Scanning Calorimetry
2. Thermogravimetric Analysis

d) Adsorption properties

1. Microbalances with the capability to measure gases and vapors from pressures 0.1mbar up to 200 bar in a temperature range 77 to 700 K

e) Mechanical properties

1. Tensile strength, (Young's modulus, Ultimate Tensile Strength, Elongation) (Universal Tensile instrument equipped with 250N and 1000N load cells)

f) Chemical composition investigation

1. FT-IR equipped with high pressure cell,
2. Ion chromatography system,

g) Optical properties

1. UV-Vis,

h) Heavy metals and toxic compounds migration studies

1. Atomic absorbance spectroscopy, (GPC with graphite furnace)
2. High performance liquid chromatography,

i) Crystal structure determination

1. X-Ray diffraction

The above mentioned tests are performed following the directions of ASTM/ISO standards. In the cases that there is a lack of standard our staff will create a test protocol for the specific property determination.

A list of standards test performed includes the following:

ASTM D3039_D3039M-00E02 Test Method for Tensile Properties of Polymer Matrix Composite Materials

ASTM D0638-03 Test Method for Tensile Properties of Plastics

ASTM D2370-02 Standard Test Method for Tensile Properties of Organic Coatings

ASTM D0882-02 Test Method for Tensile Properties of Thin Plastic Sheeting

ASTM D0618-00 Practice for Conditioning Plastics for Testing

ASTM D695 – 02a Standard Test Method for Compressive Properties of Rigid Plastics

ASTM D0570-98 Test Method for Water Absorption of Plastics

ASTM F2622 - 08e1 Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using Various Sensors

D3335-85AR05 Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy

ASTM D3624-85AR05 Test Method for Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy

ASTM D3717-85AR05 Test Method for Low Concentrations of Antimony in Paint by Atomic Absorption Spectroscopy

ASTM D3718-85AR05 Test Method for Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy

D3919-04 Practice for Measuring Trace Elements in Water by Graphite Furnace Atomic Absorption Spectrophotometry

List of instruments

- Automated Nitrogen Adsorption Porosimeters – Quantachrom (2 units)
- High pressure gravimetric adsorption system – Rubotherm (3 balances)
- Low pressure gravimetric system based on CI balance (3 systems)
- High pressure (20 bar) gravimetric adsorption system – IGA, Hiden (2 systems)
- High pressure volumetric apparatus – VTI HPA 100
- Automated PCT apparatus specialized for Hydrogen – HyEnergy/ SETARAM
- Automated oxygen permeability apparatus – Dansensor PBI 5000
- Permeation and Selectivity apparatus (5 units)
- Liquid phase adsorption apparatus
- Various chromatographic systems (gas, liquid, ionic, GS-MS, RGA)
- Tensile tester - Thumler
- FTIR - Nicolet 6700
- High pressure cell for FTIR
- DSC Calvet (up to 500 bar) - Setaram C80
- TGA - SETARAM SETSYS Evolution 18 Analyser.
- Zero length Chromatography
- AFM - Veeco Innova
- Scanning Electron microscope (FEG-SEM, Jeol JSM-7104F) with STEM and EDS detectors
- Access to USANS/SANS
- Access to SAXS/XRR



Funding

(Funding Research Program, "Project Title", Duration)

Coordinated by NCSR Demokritos

1. FP7-ENERGY-2011-1 (283077): Novel Ionic Liquid and supported ionic liquid solvents for reversible CAPture of CO₂ –IoLiCAP, 01/12/2012-30/11/2014, Total Budget 5,770,719.00 €, NCSR Demokritos budget: 1,048,161.00 €.
2. (FP7-NMP-2011-SMALL-5 (280890): Development of NEXT GENERation cost efficient automotive CATalysts- NEXT-GEN-CAT), 01/02/2012-31/01/2016. Total Budget 5,615,292.40€, NCSR Demokritos budget: 777,428.00 €.
3. FP7-PEOPLE-2009-IAPP (251562): ATLAS-H2 - Advanced Metal Hydride Tanks for Integrated Hydrogen Applications, 2010-2014. Total Budget: 2,268,340 €, NCSR Demokritos budget: 526,039 €.
4. 11SYN_8_936, ESPA-GSRT, NOVEL Technologies ON the implementation of CCS. Total Budget 683,165.00 €, NCSR Demokritos Budget: 124,300.00 €

NCSR Demokritos as partner

1. FP7-NMP-2008-4.0-2, Innovative catalytic technologies & materials for next gas to liquid processes (NEXT-GTL), 01/11/2009-31/10/2013, Total Budget: 12,570,000 €, NCSR Demokritos Budget 480,000 €.
2. FP7-INFRASTRUCTURES 2011-1 (284522), "H₂FC-European Infrastructure (Integrating European Infrastructure to support science and development of Hydrogen- and Fuel Cell Technologies towards European Strategy for Sustainable, Competitive and Secure Energy)" 01/11/2011-31/10/2015, Project Budget: 10,147,583 €, NCSR"D" Budget 371,195 €.
3. FP7-PEOPLE-2011-IAPP (286413): "High-throughput development of carbon-polymer nanocomposites for marine applications – CARBONCOMP, 01/09/2011-31/08/2015. Total Budget: 1,537,194 €, NCSR D budget: 388,211 €.
4. FP7/FCH-JU-2011-1(303428): BOR4STORE - Fast, reliable and cost effective boron hydride based high capacity solid state hydrogen storage materials, 2012-2015. Total Budget: 4,070,711 €, NCSR D budget: 513,594 €.
5. MPNS COST Action MP1103: - Nanostructured Materials for Solid-State Hydrogen Storage, 25/10/2011-24/10/2015.
6. CSA, ENV-NCP-Together-21249, "Environment NCPs cooperating to improve their effectiveness", 2008-2013, Budget: 2,997,000.00€, NCSR"D" budget: 73,345€.
7. ESPA 2007-2013, THALIS-University of Ioannina (80790). "Development of Functional Micro- & Mesoporous Hybrid Materials for Technology & Environmental Applications – POROTECH, 2012-2015. Total Budget: 600,000 €, NCSR Demokritos budget: 105,000 €.
8. ESPA 2007-2013, THALIS-University of Crete (3580): Design of novel nanoporous materials for hydrogen storage-HYDROSTORE, 2012-2015. Total Budget: 512,820 €, NCSR Demokritos budget: 147,000 €.
9. ESPA GREECE – CHINA bilateral cooperation 2012-2014 12CHN248. CarbonDioxide CAPture using a novel hybrid MEmbrane/Sorption System - CAMES. Total budget :450,000 € NCSR Demokritos budget :200,000 €
10. ESPA GREECE – CHINA bilateral cooperation 2012-2014 12CHN290. Development of Ionic Liquid based selective adsorbents and membranes for the flue gas and carbon dioxide PURification with novel hybrid adsorbent-mEmbrane process – IOLIPURE. Total budget: 424,000€ NCSR Demokritos budget: 225,000 €.
11. FP7-PEOPLE-2013-ITN (607040): Novel Complex Metal Hydrides for Efficient and Compact Storage of Renewable Energy as Hydrogen and Electricity – ECOSTORE, 01/011/2013-31/10/2017. Total Budget: 4,051,541.94 €, NCSR D budget: 235,792.24 €.
12. FP7-PEOPLE-2012-IAPP (324410): New weather-stable low gloss powder coatings based on bifunctional acrylic solid resins and nanoadditives – GLOW, 01/11/2013-31/10/2017. Total Budget: 2,520,913.37 €, NCSR D budget: 715,819.06 €.ESPA, Cooperation 2011 (1912) "Helium Recovery, towards the creation of a National Helium Reserve", NCSR D budget: 122.000 €.
13. ESPA, Aristeia II (4778) Nanostructured Hierarchical Zeolites for Sustainable Production of Second Generation Biofuels (HierZeo4Biofuel), NCSR D budget: 50.000 €.

Publications in International Journals (2014)

1. Pore structure, interface properties and photocatalytic efficiency of hydration/dehydration derived TiO₂/CNT composites, S.M. Miranda, G.Em. Romanos, V. Likodimos, R.R.N. Marques, E.P. Favvas, F.K. Katsaros, K.L. Stefanopoulos, V.J.P. Vilar, J.L. Faria, P. Falaras, A.M.T. Silvaa, *Applied Catalysis B: Environmental* (2014) 147, 65– 81. **IF=6.007**
2. Visible light active TiO₂ photocatalytic filtration membranes with improved permeability and low energy consumption, N.G. Moustakas, F.K. Katsaros, A.G. Kontos, G.Em. Romanos, D.D. Dionysiou, P. Falaras, , *Catalysis Today* (2014) 224, 56-69. **IF=3.309**
3. Intercalation study of low-molecular-weight hyperbranched polyethyleneimine into graphite oxide, T. Tsoufis, F. Katsaros, Z. Sideratou, B.J. Kooi, M.A. Karakassides, A. Siozios, *Chemistry - A European Journal* (2014) 20, 8129-8137 **IF= 5.696**
4. Tailor-made graphite oxide-DAB poly(propylene imine) dendrimer intercalated hybrids and their potential for efficient CO₂ adsorption, Tsoufis, T , Katsaros, F. , Sideratou, Z., Romanos, G., Ivashenko, O., Rudolf, P., Kooi, B.J., Papageorgiou, S., Karakassides, M.A., *Chemical Communications* (2014) 50, 10967-10970 **IF=6.718**
5. CO₂ Capture by Novel Supported Ionic Liquid Phase Systems Consisting of Silica Nanoparticles Encapsulating Amine-Functionalized Ionic Liquids, G.E. Romanos, P.S. Schulz, M. Bahlmann, P. Wasserscheid, A. Sapalidis, F.K. Katsaros, C.P. Athanasekou, K. Beltsios, N.K. Kanellopoulos, *J. Phys. Chem. C* (2014), 118, 24437–24451 **IF= 4.835**
6. High purity multi-walled carbon nanotubes: Preparation, characterization and performance as filler materials in co-polyimide hollow fiber membranes, E.P. Favvas, S.F. Nitodas, A.A. Stefopoulos, S.K. Papageorgiou, K.L. Stefanopoulos and A.C. Mitropoulos, *Separation & Purification Technology* (2014) 122 262-269. **IF= 3.065**
7. Mixed matrix hollow fiber membranes with enhanced gas permeation properties, E.P. Favvas, K.L. Stefanopoulos, J.W. Nolan, S.K. Papageorgiou and A.C. Mitropoulos and D. Lairez, *Separation & Purification Technology* (2014) 132 336-345. **IF= 3.065**
8. In situ SAXS study of dibromomethane adsorption on MCM-41 E.P. Favvas, K.L. Stefanopoulos, A.Ch. Mitropoulos and N.K. Kanellopoulos, *Microporous and Mesoporous Materials*, in press, 2014. **IF=3.209**
9. A new fuel (D-BD-J) from conventional diesel, biodiesel and JP8 blending, C.G. Tsanaktsidis, E.P. Favvas, G.T. Tzilantonis, A.V. Scaltsoyiannes, *Fuel Proc. Techn.* (2014) 127, 66–71. **IF=3.707**
10. H₂O removal from diesel and JP8 fuels: A comparison study between synthetic and natural dehydration agents, E.P. Favvas, C.G. Tsanaktsidis, G.T. Tzilantonis, S.G. Christidis, *J. Engin. Sci. Tech. Review* (2014) 7, 104–108. **IF= Pending**
11. Carbon dioxide permeation study through carbon hollow fiber membranes at pressures up to 55 bar, E.P. Favvas, *Separ. Purif. Technol.* (2014) 134, 158–162. **IF=3.534**
12. CO₂ Capture Efficiency, Corrosion Properties, and Ecotoxicity Evaluation of Amine Solutions Involving Newly Synthesized Ionic Liquids, X. Papatryfon, N. Heliopoulos, I. Molchan, L. Zubeir, N. Bezemer, M. Arfanis, A. Kontos, V. Likodimos, B. Iliev, G.Romanos, P.Falaras, K. Stamatakis, K. Beltsios, M.Kroon, G.Thompson, J. Klöckner, T.Schubert, *Ind. Eng. Chem. Res.* (2014) 53, 12083–12102. **IF 2.235**
13. Experimental investigation of the transport mechanism of several gases during the CVD post-treatment of nanoporous membranes, A. Labropoulos, C. Athanasekou, N. Kakizis, A. Sapalidis, G. Pilatos, G. Romanos, N. Kanellopoulos, *Chemical Engineering Journal* (2014) 255 377–393. **IF 4.058**
14. Phase behavior and permeability of Alkyl-methyl-imidazolium tricyanomethanide Ionic Liquids supported in nanoporous membranes, O. Tziaila, A. Labropoulos, A. Panou, M. Sanopoulou, E. Kouvelos, C.Athanasekou, K. Beltsios, V. Likodimos, P. Falaras, G.Romanos, *Separation and Purification Technology* (2014) 135, 22–34. **IF 3.065**
15. CO₂ Captured in Zeolitic Imidazolate Frameworks: Raman Spectroscopic Analysis of Uptake and Host-Guest Interactions, A.Kontos, V. Likodimos, C.Veziri, E. Kouvelos, N.Moustakas, G.Karanikolos, G.Romanos , P.Falaras, *ChemSusChem* (2014) 7, 1696–1702. **IF 7.117**
16. Prototype composite membranes of partially reduced graphene oxide/TiO₂ for photocatalytic ultrafiltration water treatment under visible light C. Athanasekou, S. Morales-Torres, V. Likodimos, G. Romanos, L. Pastrana-Martinez P. Falaras, J. L. Faria, J. L. Figueiredo, A. M.T. Silva, *Applied Catalysis B: Environmental* (2014) 158-159, 361-372. **IF 6.007**

17. Corrosion behaviour of mild steel in 1-alkyl-3-methylimidazolium tricyanomethanide ionic liquids for CO₂ capture applications, I. Molchan, G. Thompson, R. Lindsay, P. Skeldon, V. Likodimos, G. Romanos, P. Falaras, G. Adamova, B. Iliev and T. Schubert, *RSC Adv.* (2014) 4, 5300-5311. **IF 3.708**
18. Controlled surface functionalization of multiwall carbon nanotubes by HNO₃ hydrothermal oxidation, V. Likodimos, T. Steriotis, S. Papageorgiou, G. Romanos, R.R.N. Marques, R. P. Rocha, J.L. Faria, M. F.R. Pereira, J.L. Figueiredo, A.M.T. Silva, P. Falaras, *Carbon*, 2014, 69, 311-326. **IF 6.160**
19. One-step, in situ growth of unmodified graphene – magnetic nanostructured composites G. G. Pilatos, E. Vermisoglou, A. Perdikaki, E. Devlin, G. Pappas, G. Romanos, N. Boukos, T. Giannakopoulou, C. Trapalis, N. Kanellopoulos, G.Karanikolos, *Carbon* (2014) 66, 467 –475. **IF 6.160**
20. Reduced graphene oxide/iron carbide nanocomposites for magnetic and supercapacitor applications, E. Vermisoglou, E. Devlin, T. Giannakopoulou, G. Romanos, N. Boukos, V. Psycharis, C. Lei, C. Lekakou, D. Petridis, C. Trapalis, *Journal of Alloys and Compounds* (2014) 590, 102–109. **IF 2.726**
21. Arsenite remediation by an amine-rich graphitic carbon nitride synthesized by a novel low-temperature method, C. Daikopoulos,, Y. Georgiou,, A.B. Bourlinos,, M. Baikousi, M. Karakassides, R. Zboril, Th. Steriotis, Y. Deligiannakis, *Chemical Engineering Journal*, (2014) 256, pp. 347-355. **IF=4.058**
22. Hydrogen sorption properties of Pd-doped carbon molecular sieves, D. Giasafaki, G. Charalambopoulou, C. Tampaxis, A. Stubos, T. Steriotis, *International Journal of Hydrogen Energy*, (2014) 39 (18), pp. 9830-9836. **IF= 2.930**
23. A complete transport validated model on a zeolite membrane for carbon dioxide permeance and capture, E.I. Gkanas, T.A. Steriotis, A.K. Stubos, P. Myler, S.S. Makridis, *Applied Thermal Engineering*, (2014) Article in Press. **IF=2.624**
24. The required level of isosteric heat for the adsorptive/storage delivery of H₂ in the UiO series of MOFs, K.V. Kumar, G. Charalambopoulou, M. Kainourgiakis, A. Gotzias, A. Stubos, T. Steriotis, *RSC Advances*, 4 (2014) (85), pp. 44848-44851. **IF=3.708**

International Conference Presentations

1. E.G. Deze, S.K. Papageorgiou, A. Papavasiliou, F.K. Katsaros, “Development of next generation cost efficient automotive catalysts based on TMN”, *Industrial Technologies 2014*, 9-11 April 2014, Athens, Greece.
2. T. Tsoufis, F. Katsaros, Z. Sideratou, A. Sapalidis, S. Papageorgiou, “High-throughput development of carbon-polymer nanocomposites for marine applications”, *Industrial Technologies 2014*, 9-11 April 2014, Athens, Greece.
3. Z. Sideratou, F. Katsaros, D. Tsiourvas, A. Sapalidis, S. Papageorgiou, “Synthesis of Advanced top Nanocoatings with improved Aerodynamic and De-icing behavior” *Industrial Technologies 2014*, 9-11 April 2014, Athens, Greece.
4. T. Tsoufis, F. Katsaros, Z. Sideratou, M. A. Karakassides and B. Kooi, “Graphene-based nano-composite materials for environmental and energy applications”, 225th ECS, 11-15 May 2014, Orlando (FL), USA.
5. F. Katsaros, S. Papageorgiou, E. Deze, A. Papavasiliou, P. Cool, Jeff L. Nyalosaso, “Co-assembly and one-pot synthesis of functionalized mesoporous silicas with the use of polyethyleneimines”, *CIMTEC 2014*, 13th Ceramics Congress, 8-13 June 2014, Montecatini, Italy.
6. L. Formaro, R. Bresciani, S. Marzorati, M. Longhi, T. Tsoufis, F. Katsaros, Z. Sideratou, Modified Carbon Nanostructures as Catalysts For Oxygen Reduction Reactions, Presented at 65th Annual Meeting of the International Society of Electrochemistry, August, 31- September, 5, 2014, Lausanne, Switzerland.
7. E.P. Favvas, K.L. Stefanopoulos, N.Ch. Vordos and A.Ch. Mitropoulos, “In situ CH₂Br₂ adsorption and SAXS measurements in MCM-41”, 10th International Symposium on Characterisation of Porous Solids, IX COPS 2014, 11-14 May 2014, Granada, Spain.
8. E.P. Favvas, K.L. Stefanopoulos, J.W. Nolan and A.Ch. Mitropoulos, Mixed Matrices MWCNTs/Carbon Hollow Fiber Membranes: Preparation and Characterization, 10th International Symposium on Characterisation of Porous Solids, 11-14 May 2014, Granada, Spain.
9. E.P. Favvas, A.Ch. Mitropoulos, N.K. Kanellopoulos, CO₂ permeability through carbon hollow fiber membranes. From atmospheric pressure up to 55 bar, IICBE, 17th – 18th March, **2014**, Dubai, United Arab Emirates.

10. E.P. Favvas, A.Ch. Mitropoulos, N.K. Kanellopoulos, Helium recovery from natural gas sources using carbon hollow fiber membrane, 13th International Conference on Inorganic Membranes, 6th – 9th July, 2014, Brisbane, Australia.
11. Z.S. Metaxa, E.P. Favvas, C. Mercader, F. Poulin, N.D. Alexopoulos, A preliminary study on the development of graphene/cement based nanocomposites, 39th Solid Mechanics Conference (SOLMECH 2014), 1st – 5th September 2014, Zakopane, Poland.
12. E. Kouvelos, Th. Steriotis, G. Charalambopoulou, H. Grigoropoulou, N. Kanellopoulos, N₂/ CH₄ separation by natural clinoptilolite, 10th International Symposium on the Characterization of Porous Solids (COPS-X, 11-14 May 2014), Granada, Spain.
13. K. Vasanth Kumar, Th. Steriotis, G. Charalambopoulou, M. Kainourgiakis, A. Stubos, Storage of hydrogen and CO₂ capture in Zirconium oxide based metal organic frameworks, 10th International Symposium on the Characterization of Porous Solids (COPS-X), 11-14 May 2014, Granada, Spain.
14. D. Giasafaki, Ch. Tampaxis, G. Charalambopoulou, D. Mirabile Gattia, A. Montone, Th. Steriotis, Hydrogen storage properties of Pd-doped thermally oxidised Single Wall Carbon Nanohorns, 14th International Symposium on Metal-Hydrogen Systems (MH 2014), 20 - 25 July 2014, Salford, Manchester, UK.
15. A. Ampoumogli, G. Charalambopoulou, Th. Steriotis, P. Javadian, B. Richter, T.R. Jensen, Hydrogen Desorption and Cycling Properties of Eutectic Borohydrides - Mesoporous Carbons Composites, 14th International Symposium on Metal-Hydrogen Systems (MH 2014), 20 - 25 July 2014, Salford, Manchester - UK.
16. 18. E. Kouloukakis, P. de Rango, E.K. Hlil, D. Fruchart, M. Odysseos, T. Papapanagiotou, C. Christodoulou, G. Karagiorgis, G. Charalambopoulou, T. Steriotis, S. Aristotelous, E. Stamatakis, V. Psycharis, A. Stubos, Composition changes of structural and hydrogenation properties of ZrM₂ type intermetallics for high pressure hydrogen storage applications, 14th International Symposium on Metal-Hydrogen Systems (MH 2014), 20 - 25 July 2014, Salford, Manchester - UK.
17. S. Karozis, G. Charalambopoulou, Th. Steriotis, M. Kainourgiakis, A non-stochastic computational approach for the determination of the surface area of microporous solids, CCP2014 - XXVI IUPAP Conference on Computational Physics, 11-14 August 2014, Boston, Massachusetts – USA.
18. G.P. Lithoxoos, S.N. Karozis, G.Ch. Charalambopoulou, Th.A. Steriotis, N.I. Papadimitriou, M.E. Kainourgiakis, Determination of partial charges in inorganic – organic clusters based on DFT calculations, CCP2014 - XXVI IUPAP Conference on Computational Physics, 11-14 August 2014, Boston, Massachusetts – USA.
19. S. N. Karozis, G. Ch. Charalambopoulou, N. I. Papadimitriou, Th. Steriotis, M. E. Kainourgiakis, Study of basic structural, sorption and diffusion properties of novel microporous materials based on a combination of molecular simulation methods, International Conference on Mathematical Modeling in Physical Sciences (IC-MSQUARE 2014), 28-31 August 2014, Madrid – Spain.
20. A. Gotzias, G. Charalambopoulou, Th. Steriotis, Alignment of quadrupolar molecules adsorbed in slit pores with oxidised graphitic surface:GCMC computer simulations, CCP5 Annual Meeting 2014, 8-11 September 2014, Harper Adams University, UK.
21. N. Kostoglou, V. Tzitzios, Ch. Tampaxis, G. Charalambopoulou, Th. Steriotis, K. Giannakopoulos, A. Kontos, Y. Li, K. Liao, K. Polychronopoulou, C. Rebholz, Synthesis, characterization and hydrogen storage capacity of nanoporous graphene-based adsorbents, AVS 61st International Symposium & Exhibition, 9-14 November 2014, Baltimore-USA.
22. A.Ampoumogli, D. Giasafaki, Ch. Tampaxis, G. Charalambopoulou, A. Stubos, Th. Steriotis, Hydrogen storage in solids with the use of nanoporous carbon supports and scaffolds, Euro-Mediterranean Hydrogen Technologies Conference - EmHyTeC2014, 9-12 December 2014, Taormina, Italy.

Invited Lectures

23. Th. Steriotis, Hydrogen in Porous Solids and Inclusion Compounds, MH2014 Summer School on the Characterisation of Hydrogen-Material Interactions, 17-20 July 2014, Salford – UK.
24. Th. Steriotis, Heterogeneity effects on gas adsorption in porous materials, International Symposium on Advanced Nanoporous and Nanostructured Materials, September 3-4, 2014, Heraklion-Crete, Greece.

National Conference Presentations

25. N.K. Kostoglou, C. Rebholz, V. Tzitzios, C. Tampaxis, T.A. Steriotis, K. Giannakopoulos, G.C. Charalambopoulou, K. Polychronopoulou, Y. Li, K. Liao, Hydrogen storage capacity of different nanoporous carbon adsorbents 30th Panhellenic Conference on Solid-State Physics and Materials Science Heraklion, Crete, 21-24 September, 2014
26. F.D. Gegitsidis, N.D. Alexopoulos, E.P. Favvas, S.K. Kourkoulis, The effect of multi-wall carbon nanotubes addition on the performance of P84 co-polyimide hollow fiber membranes, 30th Panhellenic Conference on Solid-State Physics and Materials Science, 21st – 24th, September 2014, Heraklion, Crete, Greece.
27. A.N. Talarou, Z.S. Metaxa, N.D. Alexopoulos, E.P. Favvas, C. Mercader, Effective dispersion of nano graphene platelets in cementitious materials, 30th Panhellenic Conference on Solid-State Physics and Materials Science, 21st – 24th, September 2014, Heraklion, Crete, Greece.

Doctoral Dissertations completed in 2014

Name Olga Vangeli, Dissertation Title: Ionic Liquid modified porous material & membranes for gas separation application

Research Supervisor at NCSR: George Romanos, University where the Thesis was presented: Materials Science and Engineering Department, University of Ioannina

Name G. Pilatos, Dissertation Title: Synthesis and modification of graphitic nanostructures and composite materials for the development of advanced technology products.

Research Supervisor at NCSR Nick Kanellopoulos, University where the Thesis was presented. School of Chemical Engineering, National Technical University of Athens.

Name: Evmorfia Diamanti, Dissertation Title: Novel nanoporous materials based on graphene: Synthesis, characterization and study of properties

Research Supervisor at NCSR: Theodore Steriotis, University where the Thesis was presented: Materials Science and Engineering Department, University of Ioannina

Masters Dissertations completed in 2014

Name Ourania Tziala, Dissertation Title: Ionic Liquid Membranes for carbon dioxide Separation

Research Supervisor at NCSR George Romanos, University where the Thesis was presented. Materials Science and Engineering Department, University of Ioannina

Name Xenophon Papatryfon, Dissertation Title: Evaluation of new Ionic Liquid Solvents in a physicochemical process involving scrubbing and still columns.

Research Supervisor at NCSR George Romanos, University where the Thesis was presented. Materials Science and Engineering Department, University of Ioannina

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