

CURRICULUM VITAE

Dr. MANI KARTHIK

Researcher

CIC ENERGIGUNE

Energy Cooperative Research Centre

Parque Tecnológico

C/Albert Einstein, 48

01510 Miñano (Alava)

SPAIN

karthik_annauni@yahoo.co.in

mkarthik@cicenergigune.com



Tel.: Mobile +34 687318572

Office +34 945297108

<http://www.cicenergigune.com/en/sobreenergigune/persona/karthik-mani/>

Academic Highlights

- 2001-2005: Ph.D. in Chemistry**
Anna University, Chennai, Tamil Nadu, **INDIA**.
Thesis title: Synthesis, modification, characterization and catalytic evaluation of selected microporous and mesoporous materials.
- 1998-2000: Master of Science in Chemistry (M.Sc.)**
Bharathiar University, P.S.G. College of Arts and Science, Coimbatore, Tamil Nadu, **INDIA**.
- 1995-1998: Bachelor of Science in Chemistry (B.Sc.)**
Bharathiar University, P.S.G. College of Arts and Science, Coimbatore, Tamil Nadu, **INDIA**.

Research and Teaching Experience

- January 2012 Onwards: Researcher (Deputy Project Leader in the International European Project)**
CIC ENERGIGUNE, Energy Cooperative Research Center, **SPAIN**.
Research Field: Thermal Energy Storage Materials
- April 2010 to Feb. 2011: Research Scientist**
Department of Analytical Chemistry, University of Torino, Torino, **ITALY**.
Research Field: Analysis of trace toxic elements in soils, plants and medicines.
- Feb. 2009 to July 2009: Adjunct Assistant Professor**
Institute of Environmental Engineering, National Chiao Tung University (NCTU), Hsinchu, **TAIWAN**.
- Aug. 2006 to Jan. 2009: Postdoctoral Research Fellow**
Institute of Environmental Engineering, National Chiao Tung University (NCTU), Hsinchu, **TAIWAN**. Research Field: Synthesis, characterization and catalytic & photocatalytic activity of nanoporous materials.
- Mar. 2005 to Mar.2006: Research Scientist**
Center for Functional Nanomaterials, Department of Chemistry, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, **SOUTH KOREA**. Research Field: Synthesis, characterization and catalytic performances of nanoporous materials.
- July 2003 to May 2004: Project Fellow**
Department of Chemistry, Anna University, worked under the project from University Grant Commission (UGC), New Delhi, **INDIA**. Research Field: Polymer supported chromium (VI) reagent for the selective oxidation of organic compounds.

May 2001 to June 2003: Junior Research Fellow

Department of Chemistry, Anna University, worked under the project from Board of Research in Nuclear Sciences (BRNS) - Department of Atomic Energy (DAE), Mumbai, **INDIA**. Research Field: Synthesis, characterization and catalytic activity of mesoporous aluminophosphate - based molecular sieves.

June 2000 to April 2001: Project Assistant

Organic Chemistry Division, Central Leather Research Institute (CLRI), worked under the project from M/S Nagarjuna Agrichem Limited, Nagarjuna Hills, Hyderabad, **INDIA**. Research Field: Synthesis of novel heterocyclic compounds as agrichemical intermediates.

Dec. 1999 to May 2000: Project Fellow (M.Sc.)

Organic Chemistry Division, Central Leather Research Institute (CLRI), Chennai, **INDIA**. Research Field: Synthesis, characterization and physico-chemical studies of some lipo amino acids.

Teaching Experience

Feb. 2009 to July 2009: Adjunct Assistant Professor

Institute of Environmental Engineering, National Chiao Tung University (NCTU), Hsinchu, **TAIWAN**.

Nature of job: One semester teaching for post graduate students of NCTU

Course title: Industrial Catalysis (Course Code: IEV5202) - Topics include fundamental principles of Heterogeneous Catalysis, Shape Selective Catalysis, Environmental Catalysis and Green Chemistry, Photocatalysis, Heterogeneously Catalyzed Processes in Industry; and Fundamentals and Applications of FT-IR Spectroscopy: FT-IR analysis of organic and inorganic compounds; Biological applications of FT-IR; Industrial and Environmental Applications of FT-IR.

Publication Records

- Research Articles: **15** (International:13; National: 2)
- Book Chapters: **1**
- Conference Presentations: **15** (International:7; National:8)
- Conference Proceedings: **6** (International:5; National:1)
- Sum of the total impact factors (**IF**) (2012): **35.39**
- Sum of the total citations (2012): **243 (h-Index : 8)**

Areas of Specialization

- ✧ Material Science
- ✧ Nanotechnology
- ✧ Solar Energy Storage (Thermal Energy Storage-Concentrated Solar Power Plants (CSP))
- ✧ Surface Science and Heterogeneous Catalysis
- ✧ Photocatalysis
- ✧ Green Chemistry and Fine-Chemical Synthesis
- ✧ Air Quality Management and Pollution Control
- ✧ Analytical Chemistry

Research Accomplishments

Current research activities in CIC ENERGIGUNE, Energy Cooperative Research Center, SPAIN

- Synthesis and characterization of nanoporous materials for thermal energy storage applications

- Working as a *Deputy Project Leader in the International European Project - Collaboration with Six Countries such as France, Germany, Romania, Netherlands, Spain and United Kingdom (UK)*. <http://www.samssa.eu/>



Project title: Sugar Alcohol based Materials for Seasonal Storage Applications

- ✧ Thermal conductivity enhancement of phase change materials (PCM): **Carbon/PCM composites**
- ✧ Synthesis of **graphitized ordered mesoporous carbon foams/honeycomb** with high thermal conductivity for thermal energy storage applications
- ✧ Synthesis of nanoporous alumina/PCM composites for concentrated solar power plants (CSP) applications

During the Research Period in University of Torino, Italy

- Analysis of trace toxic metals contents in soils, plants and medicines by using ICP-AES/AAS spectroscopic techniques
- Detection and characterization of trace metals concentrations of Indian Ayurvedic Herbal Medicines by using ICP-AES/AAS spectroscopic techniques

During the Post Doctoral Research Period in NCTU, Taiwan

- Simultaneous abatement of NO_x and Volatile Organic Compounds (VOCs) by using transition metals containing microporous (zeolites) as well as mesoporous (MCM-41) based catalysts
- Selective catalytic reduction (SCR) of NO_x by using transition metals supported zeolites and MCM-41 based catalysts
- Photocatalytic abatement of toxic air contaminants by using TiO₂ supported zeolites and mesoporous materials as photocatalytic adsorbents
- Synthesis and characterization of visible light photocatalysts and TiO₂ supported photocatalysts
- Hydrogen production via photocatalytic decomposition of water (water splitting) by using titanium containing nanoporous photocatalysts
- Preparation of carbon dioxide (CO₂) adsorbed materials (CAM)
- Carbon dioxide (CO₂) capture and storage (CCS) using CAM
- Dye-modified mesoporous materials used as solid-state gas sensors (Chemical Sensors)
- Synthesis of mesoporous materials by using industrial waste as raw materials

During the Research Period in KAIST, South Korea

- Synthesis of organic-inorganic hybrid nanoporous materials
- Synthesis and characterization of micro and mesoporous H-ZSM-5 zeolites
- Functionalization and surface treatment of nanoporous materials
- Vapour and liquid phase organic reactions over solid acid catalysts- Synthesis of fine and specialty chemicals

During the Ph.D. Research Period in Anna University, India

- Synthesis and characterization of mesoporous aluminosilicates (MCM-41) and transition metals substituted MCM-41 materials
- Synthesis and characterization of mesoporous aluminophosphates (AIPOs) and transition metals substituted aluminophosphates (MAPOs)
- Modification and characterization of microporous zeolites
- Vapour and liquid phase organic reactions over zeolite and zeo-type materials as solid acid catalysts - Synthesis of fine and specialty chemicals

Technical and Specialized Skills

- Experimental skills for materials synthesis by hydrothermal as well as sol-gel methods
- Interpretation and explanation skills for characterization of the materials by using XRD, SEM, TEM, BET surface area, Solid State NMR, FT-IR, TGA, EPR and DRS UV-Vis. techniques
- Operation skills for the instruments with care and gentleness

- Experimental skills for acidity measurements by using TPD methods
- Well experience and knowledge to carry out organic reactions in liquid phase as well as vapour phase conditions and chromatographic separation techniques
- Creativity and a problem solving ability
- Good English communication skills with fluency and paper writing skills

Awards and Honors

- Research Fellowship from University of Torino, Torino, Italy
- Post Doctoral Research Fellowship from National Science Council (NSC), NCTU, Taiwan.
- Research Fellowship from KAIST, South Korea.
- Project Fellowship from UGC, New Delhi, India.
- Junior Research Fellowship from DAE- BRNS, New Delhi, India.
- Project Assistant Fellowship (Industrial Fellowship) from Nagarjuna Agrichem Limited, Hyderabad, India.
- Selected as one of the best Indian scientists by Indian Embassy, Seoul, South Korea for scientific interaction with **H.E. Dr. A.P.J. Abdul Kalam, Fr. President of India** for his country visit at Seoul (Feb.2006), South Korea.

Instruments Handled

- FT-IR Spectrophotometer with provisions for *in situ* DRIFT studies (Nicolet Avatar 360)
- UV-Vis Spectrophotometer (Shimadzu UV-1601)
- Thermo Gravimetric Analyzer (Mettler TA3000)
- Gas Chromatograph (Shimadzu GC-17A)
- Gas Chromatograph coupled with Mass-Spectrometer (Perkin Elmer Auto System XL Gas chromatograph)
- High Performance Liquid Chromatograph (Shimadzu LC-10AT VP)
- BET surface area analyzer (Micromeritics, ASAP 2000)
- Atomic Absorption Spectrometer (AAS, GBC 932 plus)
- Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-AES, Varian Liberty 100)
- X-Ray Diffractometer (Rigaku, Multiflex)

Peer Reviewer for the Journals

- *Catalysis Communications*
- *Journal of Environmental Engineering-ASCE*

Countries Visited/Worked

- South Korea, Taiwan, Hong Kong, Italy, Spain and France

Computer Knowledge

- ❖ Working knowledge in Windows98, Microsoft Office, Windows NT, Sigma Plot and ISIS & Chem. Draw.

Contributions to Book Chapters

- ❖ Hsunling Bai and **Mani Karthik**, 'CO₂ Greenhouse Gas Formation and Capture', **Handbook of Combustion, 2nd volume, Chapter 13 - Combustion Diagnostics & Pollutants, Wiley VCH Publishers Ltd.**, Editors: M. Lackner, F. Winter and A. Agarwal. 2010, ISBN: 978-3-527-32449-1.

Papers Published/Accepted and Communicated in National / International Journals

1. Yu-Chang Chang, Hsunling Bai, Hsueh-Shih Chiang, **Mani Karthik**, Shou-Nan Li, Jung-Nan Hsu and Hui-Ya Shih, 'Development of regenerative dye impregnated mesoporous silica

- materials for assessing exposure to ammonia', **The Journal of the Air & Waste Management Association (A&WMA)**, Vol. 62 (7), pp. 838-845, 2012. **IF: 1.517**.
2. Agnese Giacomino, Ornella Abollino, Mery Malandrino, **Mani Karthik** and Velayutham Murugesan, 'Determination and assessment of the contents of essential and potentially toxic elements in Ayurvedic medicine formulations by inductively coupled plasma-optical emission spectrometry', **Microchemical Journal**, Vol. 99, pp. 2-6, 2011. **IF: 3.048**.
 3. **Mani Karthik.**, Liang-Yi Lin and Hsunling Bai, 'Bifunctional mesoporous Cu-Al-MCM-41 materials for simultaneous catalytic abatement of NO_x and VOCs', **Microporous and Mesoporous Materials**, Vol. 117, pp. 153-160, 2009. **Times Cited: 13, IF: 3.235**.
 4. Yi-Tsen Chen., **Mani Karthik** and Hsunling Bai, 'Modification of CaO by organic alumina precursor for enhancing cyclic capture of CO₂ green house gas', **Journal of Environmental Engineering-American Society of Civil Engineers (ASCE)**, Vol. 135, pp. 459-464, 2009. **Times Cited: 3, IF: 1.17**.
 5. Chinte Hung., Hsunling Bai and **Mani Karthik**, 'Ordered mesoporous silica particles and Si-MCM-41 for the adsorption of acetone: A comparative study', **Separation and Purification Technology**, Vol. 64, pp. 265-272, 2009. **Times Cited: 13, IF: 2.921**.
 6. Yan-Huei Jan., Liang-Yi Lin., **Mani Karthik** and Hsunling Bai, 'Titanium dioxide/zeolite catalytic adsorbent for the simultaneous removals of NO and acetone vapors', **The Journal of the Air & Waste Management Association (A&WMA)**, Vol. 59, pp. 1186-1193, 2009. **Times Cited: 1, IF: 1.517**.
 7. S. Karthikeyan., P. Mahalingam and **M. Karthik**, 'Large scale synthesis of carbon nanotubes: A Review', **E-Journal of Chemistry**, Vol. 6(1), pp. 1-12, 2009. **Times Cited: 7**.
 8. **M. Karthik.**, M. Palanichamy and V. Murugesan, 'A mild, eco-friendly and efficient zeolite catalyzed synthesis of vibrindole A and bis(indolyl)methanes', **Studies in Surface Science and Catalysis**, Vol. 156, pp. 873-878, 2005. **Times Cited: 2, IF: 1.10**.
 9. **M. Karthik.**, C.J. Magesh., P.T. Perumal., M. Palanichamy., Banumathi Arabindoo and V. Murugesan, 'Zeolite catalyzed ecofriendly synthesis of vibrindole A and bis(indolyl)methanes', **Applied Catalysis A: Gen.**, Vol. 286, pp. 137-141, 2005. **Times Cited: 15, IF: 3.903**.
 10. A. Vinu., **M. Karthik.**, M. Miyahara., V. Murugesan and K. Ariga, '*ortho* -Selective ethylation of phenol with ethanol catalyzed by bimetallic mesoporous catalyst, CoAl-MCM-41, **J. Molecular Catalysis A: Chem.**, Vol. 230, pp. 155-161, 2005. **Times Cited: 12, IF: 2.947**.
 11. **M. Karthik.**, A. Vinu., A.K. Tripathi., N.M. Gupta., M. Palanichamy and V. Murugesan, 'Synthesis, characterization and catalytic performance of Mg and Co substituted mesoporous aluminophosphates', **Microporous and Mesoporous Materials**, Vol. 70, pp. 15-25, 2004. **Times Cited: 38, IF: 3.235**.
 12. **M. Karthik.**, A.K. Tripathi., N.M. Gupta., A. Vinu., M. Hartmann., M. Palanichamy and V. Murugesan, 'Characterization of Co,Al-MCM-41 and its activity in the *t*-butylation of phenol using isobutanol', **Applied Catalysis A: Gen.**, Vol. 268, pp. 139-149, 2004. **Times Cited: 38, IF: 3.903**.
 13. **M. Karthik.**, A.K. Tripathi., N.M. Gupta., M. Palanichamy and V. Murugesan, 'Zeolite catalyzed electrophilic substitution reaction of indoles with aldehydes: synthesis of bis(indolyl)methanes', **Catalysis Communications**, Vol. 5, pp. 371-375, 2004. **Times Cited: 57, IF: 2.986**.

14. V. Murugesan., K.K. Cheralathan and **M. Karthik**, 'Catalysis by materials for fine chemical production', **Bulletin of the Catalysis Society of India**, Vol. 3, pp. 23-42, 2004. *Times Cited: 1*.
15. C.J. Magesh., R. Nagarajan., **M. Karthik** and P.T. Perumal, 'Synthesis and characterisation of bis(indolyl)methanes, tris(indolyl)methanes and new diindolylcarbazolylmethanes mediated by Zeokarb-225, a novel, recyclable, eco-benign heterogeneous catalyst', **Applied Catalysis A: Gen.**, Vol. 266, pp. 1-10, 2004. *Times Cited: 45, IF: 3.903*.
16. Agnese Giacomino, Ornella Abollino, Mery Malandrino, **Mani Karthik** and Velayutham Murugesan, Characterization of Indian Ayurvedic Medicine Formulations, **Manuscript under preparation. 2012**.

Papers Presented in National / International Conferences

1. **Mani Karthik.**, Liang-Yi Lin and Hsunling Bai, 'Using Waste Organic Solvent Vapors as the Reducing Agent of deNO_x Process', Proceedings of the 101th Air & Waste Management Association (A&WMA), Annual Conference & Exhibition, June 24-27, 2008, Oregon Convention Center, Portland, Oregon, **USA**.
2. Yi-Tsen Chen., **Mani Karthik** and Hsunling Bai, 'Modification of CaO adsorbent for enhancing its adsorption capacity during cyclic CO₂ greenhouse gas capture', Proceedings of the 101th Air & Waste Management Association (A&WMA), Annual Conference & Exhibition, June 24-27, 2008, Oregon Convention Center, Portland, Oregon, **USA**.
3. Hsueh-Shih Chiang., Hsunling Bai., **Mani Karthik.**, Shou-Nan Li and Jung-Nan Hsu, 'Ammonia odor adsorption and sensing via a simple color change adsorbents made by mesoporous silica materials', Proceedings of the 101th Air & Waste Management Association (A&WMA), Annual Conference & Exhibition, June 24-27, 2008, Oregon Convention Center, Portland, Oregon, **USA**.
4. **Mani Karthik.**, Liang-Yi Lin and Hsunling Bai, 'Mesoporous Cu-MCM-41 and Cu-Al-MCM-41 catalysts for the simultaneous abatement of NO_x and VOCs in exhaust gas stream', Proceeding of 4th conference on Environmental Protection and Nanotechnology, May 25, 2007, National Chung Hsing University, Taichung, **Taiwan**.
5. Chin-Te Hung., Hsunling Bai., **Mani Karthik** and Liang-Yi Lin, 'Comparison of mesoporous silica particles and MCM-41 as adsorbents for acetone removal', Proceeding of 4th conference on Environmental Protection and Nanotechnology, May 25, 2007, National Chung Hsing University, Taichung, **Taiwan**.
6. Hsunling Bai., Yi-Tsen Chen, **Mani Karthik**, 'Comparison of cyclic carbon dioxide capture between CaO and Al modified CaO adsorbents', Chemrawn-XVII and ICCDU-IX Conference on Greenhouse Gases Mitigation and Utilization, July 8-12, 2007, Kingston, Ontario, **Canada**.
7. **M. Karthik.**, M. Palanichamy and V. Murugesan, 'A mild, eco-friendly and efficient zeolite catalyzed synthesis of vibrindole A and bis(indolyl)methanes', Nanoporous Materials - IV, June 8-11, 2005, Niagara Falls, Ontario, **Canada**.
8. **M. Karthik.**, S. Gopalakrishnan., Banumathi Arabindoo., M. Palanichamy and V. Murugesan, 'ZnY Zeolite as an Efficient Catalyst for the Synthesis of Vibrindole A and Bis(indolyl)methanes', 17th National symposium on Catalysis, Jan. 18-20, 2005, CSMCRI, Bhavnagar, **India**.
9. **M. Karthik.**, A.K. Tripathi., N.M. Gupta., M. Palanichamy and V. Murugesan, 'Synthesis, characterisation of mesoporous CoAPO molecular sieves and its catalytic performance', Workshop on Advances in Catalysis, Jan. 6-7, 2004, Loyola College, Chennai, **India**.

10. V. Murugesan., K.K. Cheralathan and **M. Karthik**, 'Catalysis by materials for fine chemical production', Workshop on Advances in Catalysis, Jan. 6-7, 2004, Loyola College, Chennai, **India**.
11. **M. Karthik.**, A.K. Tripathi., N.M. Gupta., Banumathi Arabindoo., M. Palanichamy and V. Murugesan, 'HY zeolite: An efficient catalyst for the electrophilic substitution of indoles with aldehydes and ketones', National Seminar on Role of Chemistry in Emerging Areas of Applied Sciences, Mar. 15-17, 2004, Department of Chemistry, Sri Venkateswara University, Tirupati, **India**.
12. **M. Karthik.**, M. Palanichamy and V. Murugesan, 'Synthesis and characterisation of Mg and Co containing mesoporous aluminophosphate-based molecular sieves'. Proceedings of National Conference on Recent Advances in Molecular Interactions (NCRAMI-2004), Mar. 26-27, 2004, Department of Physics, PSG College of Arts and Science, Coimbatore, **India**.
13. **M. Karthik.**, A.K. Tripathi., N.M. Gupta., M. Palanichamy and V. Murugesan, 'A novel synthesis of Mg and Co containing mesoporous aluminophosphate-based molecular sieves', Fifth National Symposium In Chemistry, Feb. 7-9, 2003, Central Leather Research Institute, Chennai, **India**.
14. **M. Karthik.**, A. Vinu., A.K. Tripathi., N.M. Gupta., M. Palanichamy., Banumathi Arabindoo and V. Murugesan, '*tert*-Butylation of phenol with isobutanol over mesoporous Co-Al-MCM-41', 16th National Symposium on Catalysis and 1st Indo-German Conference on Catalysis, Feb. 6-8, 2003, Indian Institute of Chemical Technology, Hyderabad, **India**.
15. **M. Karthik.**, K.K. Cheralathan., M. Palanichamy., Banumathi Arabindoo and V. Murugesan, '*tert*-Butylation of m-Cresol over Al-MCM-41 supported phosphotungstic acid', National Symposium on New Horizons in Heterogeneous Catalysis, Feb. 22-24, 2002, Banaras Hindu University, Varanasi, **India**.

Personal Profiles

<i>Father's Name</i>	: T. G. Mani
<i>Date of Birth</i>	: July 15, 1978
<i>Place of Birth</i>	: Thiruchengodu, Namakkal (Dt.), Tamil Nadu, INDIA
<i>Nationality</i>	: Indian
<i>Sex</i>	: Male
<i>Marital Status</i>	: Married
<i>Passport number</i>	: E8244695
<i>Permanent Address</i>	: 43-B/3, Theradi Street, Jothi Madam, Thiruchengodu – 637211, Namakkal (Dt.) Tamil Nadu, INDIA Ph. No.: (Res) +91-4288-250227

References

Prof. V. Murugesan (Ph.D. supervisor)

Director of Research
Anna University
Chennai - 600 025, **INDIA**
Email: y_murugu@hotmail.com

Prof. M. Palanichamy (Research collaborator)

Department of Chemistry
Anna University
Chennai - 600 025, **INDIA**
Email: palani_annachem@yahoo.com

Dr. P.T. Perumal (Research collaborator)

Deputy Director and Head
Organic Chemistry Division
Central Leather Research Institute
Adyar, Chennai - 600 020, **INDIA**
Email: ptperumal@hotmail.com
ptperumal@gmail.com

Prof. Hsunling Bai (Advisor during Post Doctoral Research period)

Institute of Environmental Engineering
National Chiao Tung University
Hsinchu 300, **TAIWAN**
Email: hlbai@mail.nctu.edu.tw