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Khaled M.H. Mohammed

Employment

Nov 2015 – Present

Lecturer of Physical Chemistry, Chemistry Department, Faculty of Science, Sohag University, Sohag, Egypt.

Teaching duties:

Teaching of some chemistry courses and laboratory supervisions for undergraduate & postgraduate students. The courses are covered the following topics:

- General Physical Chemistry.
- Advanced Surface and Colloids.
- Solid-state chemistry.
- Thermodynamics.
- Heterogeneous Catalysis.

Research duties:

Parallel to my role as a lecturer, I am a co-investigator in one of the STDF (Science & Technology Development Fund) projects funded by the Egyptian government. The project is mainly focused on the preparation and characterization of sustainable nanostructured activated carbons (SNACs) derived from biomass based materials and their potential applications for removing heavy metals (ca. Cr^{6+}, Cd^{2+}, Hg^{2+}, Pd^{2+}, Cu^{2+} and Zn^{2+} ions) from polluted water samples. Another project which I am heavy involved in is the preparation and functionalization of ordered mesoporous carbons (OMCs) by soft and hard-templating approach for adsorption applications.

Nov 2013 – Oct 2015

Research Associate, University College London (UCL), UK Catalysis Hub, UK.

To work mainly on designing active sites for catalysis in the "*Catalyst Design*" theme based at the Research Complex at Harwell. Research task focus on the synthesis and development of substituted active metal centres within framework architectures for C-H activation to highly valuable industrial products. The research utilizes many advanced spectroscopic techniques with a particular emphasis on synchrotron radiation facility at Diamond Light Source Ltd, UK, particularly using XANES and EXAFS techniques, to an understanding the structure-activity relationships of the prepared catalysts. Also, I have acted as a shift team leader in the Beamtime Allocation Group (BAG) experiments working for members of the UK Catalysis Hub. In addition to my role, I am heavily involved in preparing and/or promoting supported noble metal nanoparticles for many catalytic industrial applications including CO oxidation, reduction of CO_2 and H_2 reforming processes.

Nov - Dec 2012

Surface Support Scientist, Diamond Light Source (DLS), UK

To work in the off-line labs of the beamline I06, Nanoscience, mainly to operate the AFM and STM instruments and to assist the principal beamline scientist for conducting external users' experiments.

2007 – 2009	**Assistant Lecturer, Chemistry Department, Faculty of Science, Sohag University, Sohag, Egypt** Laboratory demonstrator/supervision for undergraduate students (3rd and 4th year).
2002 – 2007	**Teaching Assistant, Chemistry Department, Faculty of Science, Sohag University, Sohag, Egypt** Laboratory demonstrator/supervision for undergraduate students (1st and 2nd year).

Education and Qualifications

2010 – 2014	**University of Southampton, Diamond Light Source (DLS) and Ministry of Higher Education in Egypt, funded PhD in Chemistry - <u>University of Southampton Award</u>** ***Preparation and Characterisation of some Nano-Structured Catalytic Materials for Low-Temperature Oxidation of Carbon Monoxide*** The project involved the preparation, characterisation and catalytic testing of novel supported Rh nanoparticles promoted by different transition metal oxides (ca. ceria, zirconia and chromia). *In situ* QEXAFS-MS experiments were conducted at B18, DLS, to understand the structure-performance relationships of the prepared catalysts under operating conditions. These experiments were performed mainly to develop the B18 Microreactor-QEXAFS setup for conducting ***Operando*** (*in situ*) experiments.
2004 – 2007	**Sohag University, Egypt funded a part-time MSc Degree in Chemistry - <u>Sohag University Award</u>** ***Preparation, Characterization and Catalytic Activity Studies on Heteropolyacids and Their Substituted Salts*** The project involved the preparation of novel copper and silver phosphotungstates and examining their activity towards ethanol oxidation using catalytic bed reactor-GC system. The prepared materials were characterized using; FT-IR, Pyridine desorption, XRD, TGA and N_2 Physisorption.
1998 – 2001	**BSc in Chemistry**, South Valley University, Sohag, Egypt. Very good with honors.
June 2008	Internet Based **TOEFL** (iBT) certificate with a total score of 53.
July 2007	**ICDL certificate**.

Research Interests

- Heterogeneous catalysis.
- Preparation of nanocomposite materials including supported noble metals and transition metal oxides by: sol-gel processing, incipient wetness impregnation, co-precipitation, precipitation-deposition, sol-immobilization and controlled surface modification methods.
- Preparation of well-ordered microporous and mesoporous materials using templating processes.
- Preparation of activated carbons (ACs) derived from biomass.
- X-ray Photoelectron Spectroscopy (XPS).
- X-ray Absorption Fine Structure spectroscopy (XAFS: XANES & EXAFS).
- Catalyst characterization: DR-UV/Vis, TPR, SEM, TEM, XRD, FT-IR, N_2 Physisorption and TGA.
- Catalytic reactors: Batch-, Flow- and Micro-reactors.
- Quantification techniques: (on/off line) GC, GC-MS and HPLC.

Summary of Key Skills

Teamwork and leadership	• The ability to work independently and in a team and manage a scientific research. • The ability to teach, help and supervising Undergraduate & Postgraduate students in their projects. • The ability to liaise with national and international collaborators to plan and perform experiments at different synchrotron light source facilities. •
Communication	• Experienced presentations of the scientific findings using PowerPoint throughout formal and group meetings. • The ability to write good reports in English and submit manuscripts for publications using either word or Latex templates. • Active participation in conferences and scientific meetings including the preparation of posters.
Other	• A good knowledge of Windows, Macintosh, Linux, Microsoft Office, LaTex packages, OriginLab, DataGraph, gnuplot, Endnote, Chemdraw, CasaXPS software, IFEFFIT packages for analyzing XANES and EXAFS data, CelRef for indexing XRD patterns.

Activities and Interests

Outside my work I am an active person with social activities and interested in many types of sports including table tennis, swimming and basketball. Also, I love cycling, walking and reading books in my spare time.

Selected Publications (Journal Impact Factor = JIF)

- Kamal M.S. Khalil, Omar A.S. Allam, Mohamed Khairy, **K. M. H. Mohammed**, Rafat M. Elkhatib and Mervat A. Hamed, "*High surface area nanostructured activated carbons derived from sustainable sorghum stalk*". ***Journal of Molecular Liquids***, 247, 386-396, **2017**.
  DOI: https://doi.org/10.1016/j.molliq.2017.09.090, Paper **JIF = 3.648**.
- Kroner, A. B., **K. M. H. Mohammed**, Gilbert, M., Duller, G., Cahill, L., Leicester, P., Woolliscroft, R., Shotton, E. J., "*A flexible gas flow reaction cell for in situ x-ray absorption spectroscopy studies*". *AIP Conference Proceedings* 1741, 030014, **2016**.
  DOI: https://doi.org/10.1063/1.4952837
- **K. M. H. Mohammed**, J. Callison, A. Chutia, P. P. Wells, A. M. Beale, C. R. A. Catlow and Robert Raja, "*Design and Control of Lewis Acid Sites in Sn-substituted Microporous Architectures*" ***Journal of Materials Chemistry A***, 4, 5706–5712, March **2016**.
  DOI: 10.1039/c5ta10283a, Paper **JIF = 7.443**
- C. Brookes, P. P. Wells, E. K. Gibson, D. Gianolio, **K. M. H. Mohammed**, S. Parry, S. Rogers, I. Silverwood, and M. Bowker, "*In situ spectroscopic investigations of MoO_x/Fe_2O_3 catalysts for the selective oxidation of methanol*" ***Catalysis Science & Technology***, 6, 722–730, Aug **2015**.
  DOI: 10.1039/C5CY01175B, Advance Article**. JIF = 5.426**
- E. K. Gibson, A. M. Beale, C. R. A. Catlow, A. Chutia, D. Gianolio, A. Gould, A. Kroner, **K. M. H. Mohammed**, M. Perdjon, S. M. Rogers, and P. P. Wells, "*Restructuring of AuPd nanoparticles studied by a combined XAFS/DRIFTS approach*" ***Chemistry of Materials***, 27(10), 3714–3720, April **2015**.
  DOI: 10.1021/acs.chemmater.5b00866, Paper **JIF = 8.354**
- A. Villa, S. Campisi, **K. M. H. Mohammed**, N. Dimitratos, F. Vindigni, M. Manzoli, W. Jones, M. Bowker, G. J. Hutchings, and L. Prati, "*Tailoring the selectivity of glycerol oxidation by tuning the acid–base properties of Au catalysts*" ***Catalysis Science & Technology***, 5(2), 1126–1132, Oct. **2014**.
  DOI: 10.1039/C4CY01246A, Paper **JIF = 5.426**
- **K. M. H. Mohammed**, P. P. Wells, A. B. Kroner, K. M. S. Khalil, A. A. El-Samahy, A. Dent and J. Evans, "Structure-Activity Correlations of *Ceriated Rh/MCM-41 Catalyst for CO Oxidation*" will be submitted to ***Catalysis Science & Technology*** by the 30th of Nov. **2017**.
  JIF = 5.426

- **K. M. H. Mohammed**, P. P. Wells, A. B. Kroner, K. M. S. Khalil, A. A. El-Samahy, A. Dent and J. Evans, "In Situ Studies on *ZrOx and CeZrOx Promoted Rh/MCM-41 Catalyst for CO Oxidation: Probing Local Structure Changes at Rh K and Zr K edges*" will be submitted to ***ACS Catalysis*** by the 1st of January **2018**. **JIF = 9,046**

Conferences

A. Oral Presentations

- **2 Jul 2015:** UK Catalysis Hub Summer Conference at Milton Hill De Vere Hotel, Steventon, UK. Participating by an oral presentation.
- **26-31 July 2015:** BZA 2015 "38th International Annual Meeting of the British Zeolite Association in Chester, UK. Participating by an oral presentation.
- **14-17 March 2016:** 1st International Conference on Applied Chemistry (ICAC-1), Hurghada, Egypt.
- **19 April 2017:** The 2nd Annual Science Day-Faculty of Science-Sohag University, Sohag, Egypt.

B. Posters

- **8-9 June 2015:** Royal Society Discussion Meeting "Catalysis Improving Society" at the Royal Society in London, **UK**. Participating by a poster.
- **15 Dec 2014:** UK Catalysis Hub Conference at Research Complex at Harwell (RCaH), **UK**. Participating by a poster.
- **7 Jul 2014:** UK Catalysis Hub Conference at Research Complex at Harwell (RCaH), **UK**. Participating by a poster.
- **10 Dec 2013:** UK Catalysis Hub Conference at Research Complex at Harwell (RCaH), **UK**. Participating by a poster.
- **11 Jan 2012:** Structure Consortium at Research Complex at Harwell (RCaH), **UK**. Participating by a poster.
- **11 June 2012:** Diamond Away Day, at Sheepdrove Eco Conference, **UK**. Participating by a poster.
- **15 June 2012:** Catalysis, Support and Activity Symposium, Southampton University, **UK**. Participating by a poster.

Training & Workshops

- **24 March 2015:** Writing Grant Proposals Workshop – Delivered by ThinkWrite at Harwell Campus, UK.
- **23 March 2015:** Early Career Workshop for Impact Acceleration – Harwell Campus, UK.
- **12 March 2015:** Effective Team Working Workshop – Delivered at UCL, London, UK.

Bibliography

Khaled Mohammed joined Sohag University in February 2015 as Lecturer in Physical Chemistry and member of Nanomaterials and Surface Chemistry Research group leaded by Prof. Kamal M. S. Khalil. Before for taking up this role, Khaled worked for the University College London, and was based full time at the Research Complex at Harwell (RCaH) as a Research Associate (November 2013 – October 2015) designing active sites for catalysis in the "Catalyst Design" theme, the EPSRC UK Catalysis Hub. Prior to this, Khaled obtained a PhD in the Preparation and Characterisation of some Nano-Structured Catalytic Materials for Low-Temperature Oxidation of Carbon Monoxide, (University of Southampton, 2014), under supervision of Professor John Evans.

Khaled's research focuses on controlled catalyst preparation methods, *in situ* characterizations and activity testing, which are essential tools in understanding the complex properties of catalysts under operating conditions with a particular emphasis on synchrotron radiation based facilities (particularly using XANES and EXAFS techniques).

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