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Profile: I am an alumni of Quaid-e-Azam University Islamabad and the University of Liverpool (UK), and a tenured Professor and the founding Chair of Chemistry Department at LUMS. Prior to joining LUMS in 2008, I initiated Nanobiotech research at NIBGE, Faisalabad, as a founding Project Director of Nanobiotechnology in 2005. I have served as the Chair of National Nanotech Experts Panel at PCST in 2015 to draft Technology Foresight report. Currently, I am the member of the National Core Group of Chemistry and Chair of the National Core Group of Nanotechnology formed by the PM Task Force on Science & Technology. I have been awarded 02 Gold Medals in Chemistry by Pakistan Academy of Sciences (PAS) i.e., Prof. Atta-ur-Rahman Gold Medal in 2007 & PAS Gold Medal in 2014. Recently, I have also been admitted as Fellow of Royal Society of Chemistry (FRSC) and more recently (Dec. 2021), elected as a **Fellow of Pakistan Academy of Sciences**.

My research interests include the design and synthesis of customized metal/metal oxide nanoparticles with decent control over their size, shape and surface chemistry and using them as building blocks to develop new nanostructured materials. Many such nanomaterials have been explored for their potential applications in biomedical sciences (biosensing and drug delivery), environmental sciences (wastewater treatment, CO oxidation, CO₂ capture & conversion) and renewable energy technologies (water splitting and H₂ production and storage) in collaboration with national and international groups. While in Pakistan throughout my academic career (except PhD & short visits), I have tried to maintain the quality of my research articles (~130) with an average impact factor of over 6.3/article and an average citation of ~50/article.

Education

- Ph.D. (Chemistry), University of Liverpool, UK, 2005 (PhD advisors: Prof. Andrew I. Cooper & Prof. Mathias Brust)
- M.Sc. (Chemistry), Quaid-i-Azam University, Islamabad, Pakistan, 1993.

Professional Experience

- Professor (Tenured)**, May 2020 – to date) at Department of Chemistry & Chemical Engineering, SBA School of Science & Engineering (SSE), LUMS, Lahore, Pakistan.
- Consultant** (June-Aug 2021), University of Engineering & Applied Sciences, Swat, KPK, Pakistan
- Foreign Professor** (Jun 06-July 20, 2019), College of Chemistry & Chemical Engineering, Huazhong University of Science & Technology (HUST), Wuhan, China
- Foreign Professor** (Oct-Nov., 2017), College of Chemistry & Chemical Engineering, Huazhong University of Science & Technology (HUST), Wuhan, China
- Professor of Renewable Energy Systems** (2017) at US-Pakistan Center for Advanced Studies in Energy, University of Engineering & Technology, Peshawar, Pakistan.
- Consultant USAID (Jun-Aug, 2018)** at US-Pakistan Center for Advanced Studies in Energy, University of Engineering & Technology, Peshawar, Pakistan.
- Department Head/Chair of Chemistry** (2009 - Dec. 31, 2016), SBA School of Science & Engineering (SSE), LUMS, Pakistan.
- Visiting Faculty/Scientist** at several prestigious institutions including UMass (Amherst, USA), EPFL (Lausanne, Switzerland), and KAUST (Saudi Arabia) during each summer since 2009.
- Project Director**, 2006-08, Nanobiotech project, National Institute for Biotechnology & Genetic Engineering (NIBGE), Faisalabad, Pakistan.
- Scientific Officer/Senior Scientist**, 1997-2008, NIBGE, Faisalabad, Pakistan.

Honors & Awards

- 2021**, Fellow (elected) of Pakistan Academy of Sciences
- 2021**, Fellow of Royal Society of Chemistry, UK
- 2016**, Charles Wallace Visiting Fellow at the University of Cambridge, UK.
- 2014**, Gold Medal in Chemistry by Pakistan Academy of Sciences for overall achievements in Chemistry.
- Honored as the first scientist interviewed at [the launch of Facebook page of Bioconjugate Chemistry](#) (An ACS journal).

- 2007, Professor Atta-ur-Rehman Gold Medal, by Pakistan Academy of Sciences.
- 2005-2016, Regular recipient of Research Productivity Award each year by Pakistan Council for Science & Technology (PCST), Ministry of Science & Technology, Govt. of Pakistan.
- 2001-2005, PhD fellowship award by Ministry of Science & Technology, Govt. of Pakistan, to study in UK.

Research Projects Awarded

- 2021-2024, PSF-NSFC (Pak-China collaborative) proposal recently accepted on “Organic-inorganic hybrid microporous polymeric nanocomposites for the capture and conversion of CO₂ – Applications in environment and energy technologies”. **Principal Investigator (PI)**, from Pakistan side) – **Rs. ~6.3 million (Pak) – 2.0 million Yuan (China)**.
- 2017-2020, HEC (Pakistan) NRPU research grant on “Low-cost but more effective transition metal alloy nanoclusters for electrocatalytic water oxidation”. **Principal Investigator (PI) – Rs. 4.19 million**
- 2016-2017, EPSRC (UK) – Global Challenge Research Fund for “Smart nanoclusters to address multidrug resistance”. **Co-investigator - 92,000 GBP (total)**
- 2016-2017, US-Pak Center for Advanced Studies in Energy – University of Engineering & Technology (UET), Peshawar, awarded a joint research project to Dr. Saim Saheer (UET) and myself for “Synthesis of non-noble electrocatalysts for anion exchange membrane fuel cells (AEMFC). **Co-PI - Rs. 3.0 million**
- 2014-2016, UET (Peshawar)-LUMS-Cambridge collaborative project on “3rd generation solar cells: Construction of a proof-of concept preliminary prototype”. **Co-PI - Rs. 14 million.**
- 2013-2016, Development of ultrasensitive, robust and affordable nanoparticle-based test strips for detecting bacteria – A Pak-US collaborative project funded by HEC and US National Academy of Sciences in collaboration with Prof. Vincent Rotello at the University of Massachusetts, Amherst, USA. **Principal Investigator (Pakistan side) - 600,000 USD (total)**
- 2011-2013, Metal alloy nanoclusters for catalytic and bio-imaging applications by DAAD jointly with Prof. Wolfgang Parak, Philipps University, Marburg, Germany. **Principal Investigator (Pakistan side) - ~24,000 Euro (total)**
- 2006-2010, Development of Nanobiotech lab at National Institute for Biotechnology & Genetic Engineering (NIBGE) by Ministry of Science & Technology, Govt. of Pakistan (PC-1). **PI/PD - ~2.5 Million USD**
- 2006-2007, Synthesis of Plasmon resonance particles for bioanalytical applications awarded by Third World Academy of Sciences (TWAS). **Principal Investigator - 6,000 USD.**

National/International Symposia/Workshops/Conferences Organized

- COMSTECH International Workshop on “Nanomedicine – Development & Challenges” on March 15-17, 2021. **Focal Person (Technical)**
- 2nd International Conference on Nanoscience & Nanotechnology (ICONN-2019) at Lahore University of Management Sciences on Nov. 1-2, 2019, mainly supported by Pak-UK Education Gateway, Pakistan Academy of Sciences & Pakistan Science Foundation. **Principal Organizer.**
- The International Conference on Nanoscience & Nanotechnology (ICONN-2018) organized by National University of Science & Technology (NUST), Islamabad, and LUMS on Nov. 1-2, 2018. **Lead Organizer** from LUMS side.
- USPCAS-EP “International Conference on Sustainable Energy Technologies” organized on Sep. 12-13, 2017, at Serena Hotel, Islamabad, sponsored by USAID. **Chief Organizer.**
- USPCAS-EP “National Conference on Green Energy Technologies” organized on May 18, 2017, at PC Hotel, Peshawar, sponsored by USAID. **Chief Organizer.**
- International symposium on “Nanomaterials - Potential Applications & Challenges” at LUMS in Oct. 31, 2013. **Principal Organizer.**
- Chemical Trends 2013- A conference on “Recent Trends in Chemical Research” organized at LUMS, Lahore, Pakistan on September 27, 2013, sponsored by Fulbright. **Co-organizer.**
- An international symposium/workshop on Nanomedicine at Hussain Ebrahim Jamal (HEJ) Research Institute of Chemistry at University of Karachi in collaboration with HEJ and University of Illinois, Urbana Champaign (UIUC), on Dec 20-23, 2010. **Resource person and co-organizer.**
- A workshop at SBA School of Science and Engineering (SSE), LUMS, Lahore, on “The role of nanomaterials in drug delivery and cancer treatment” on July 28-29, 2008, sponsored by HEC and private vendors. **Principal Organizer.**
- An International Nanomedicine Workshop at COMSTECH, Islamabad, on March 13-20, 2008, sponsored by COMSTECH-HEC. **Resource person and technical organizer.**

Selected Research Publications:

- Immobilized covalent triazine frameworks films as effective photocatalysts for hydrogen evolution reaction. Xunliang Hu, Zhen Zhan, Jianqiao Zhang, Irshad Hussain, Bien Tan. *Nature Communications*, 2021, 12, 1-9.
- Fundamentals and design-led synthesis of emulsion-templated porous materials for environmental applications. Muhammad Ahmad Mudassir, Tariq Mahmood Ansari, Haifei Zhang and Irshad Hussain*. *Advanced Science* 2021 (in press).
- Recent advances in the electrocatalysts towards alcohols assisted energy-saving hydrogen production. Farhan Arshad, Tanveer ul Haq, Irshad Hussain*, Falak Sher*. *ACS Applied Energy Materials* 2021 (in press).
- Facile preparation of silver nanocluster self-assemblies with aggregation-induced emission by equilibrium shifting. Lianyu Li, Weiyao Xi, Irshad Hussain, Meiling Chen, Bien Tan. *Nanoscale* 2021, 13, 14207
- Hyperbranched polyethylenimine-tethered multiple emulsion-templated hierarchically microporous poly(acrylic acid)-Al₂O₃ nanocomposite beads for water purification. Muhammad Ahmad Mudassir, Syed Zajif Hussain, Shazia Kousar, Haifei Zhang, Tariq Mahmood Ansari and Irshad Hussain*. *ACS Applied Materials and Interfaces* 2021, 13 (23), 27400.
- A new eco-friendly phosphorus and nitrogen rich inorganic-organic hybrid hypercrosslinked porous polymers via low cost strategy. Muhammad Amin Abid, Shumaila Razaque, Irshad Hussain, Bien Tan. *Macromolecules* 2021, 54 (12), 5848.
- Mechanistic insight of dye Degradation using TiO₂ anchored α -MnO₂ nanorods as promising sunlight driven photocatalyst. Ata Ullah, Lutfur Rahman, Syed Zajif Hussain, Muhammad Waseem Abbas, Abdul Tawab, Asim Jilani, Sadia Zafar Bajwaa, Waheed S. Khana, Rabia Riaz, Irshad Hussain, Asma Rehman. *Materials Science & Engineering B* 2021, 271, 115257.
- Topical delivery of curcumin-loaded transfersomes gel ameliorated rheumatoid arthritis by inhibiting NF- κ B pathway. Eleesha Sana, Mahira Zeeshan, Qurat Ul Ain, Ashraf Ullah Khan, Irshad Hussain, Salman Khan, Elise Lepeltier, Hussain Ali. *Nanomedicine* 2021, 16, 819.
- Development of poly-L-lysine multi-functionalized muco-penetrating self- emulsifying drug delivery system (SEDDS) for improved solubilization and targeted delivery of ciprofloxacin against intracellular Salmonella typhi. Rabia Arshad, Tanveer A. Tabish, Abbas Ali Naseem, Muhammad Rauf ul Hassan, Irshad Hussain, Shahzad Shaikh Hussain, Gul Shahnaz. *Journal of Molecular Liquids* 2021, 333, 115972
- Supported polyoxometalates as emerging nanohybrid materials for photochemical and photoelectrochemical water splitting. Irfan Ullah, Akhtar Munir, Ali Haider*, Najeeb Ullah and Irshad Hussain*. *Nanophotonics* 2021, 10, 1595.
- Gd-Doped Ni-Oxychloride Nanoclusters: New Nanoscale Electrocatalysts for High-Performance Water Oxidation through Surface & Structural Modification. Tanveer ul Haq, Yousef Haik, Irshad Hussain, Habib ur Rehman and Tareq A. Al-Ansari*. *ACS Applied Materials and Interfaces* 2021, 13, 468.
- Nanoparticles-assisted delivery of antiviral-siRNA as inhalable treatment for human respiratory viruses: A candidate approach against SARS-COV-2. Ata Ullah, Javaria Qazi, Lutfur Rahman, Antonios G. Kanaras, Waheed S. Khan, Irshad Hussain* and Asma Rehman*. *Nano Select*, 2020, 1(6), 612.
- Bactericidal effect of 5-mercapto-2-nitrobenzoic acid coated silver nanoclusters against multidrug-resistant Neisseria gonorrhoeae. Maria Isabel Lucio, Maria-Eleni Kyriazi, Joshua Hamilton, Diego Batista, Alexander Sheppard, Elisabeth Sams-Dodd, Maria Humbert, Irshad Hussain, Myron Christodoulides, Antonios Kanaras*. *ACS Applied Materials & Interfaces*, 2020, 12 (25), 27994.
- Green synthesized selenium doped zinc oxide nano-antibiotic: Synthesis, characterization and evaluation of antimicrobial, nanotoxicity and teratogenicity potential. Abdul Majid, Faryal Javed, Sundus Akhtar, Uzma Saleem, Fareeha Anwar, Bashir Ahmad, Akhtar Nadhman, Gul Shahnaz, Irshad Hussain, Syed Zajif Hussain and Muhammad Farhan Sohail*. *Journal of Materials Chemistry B*, 2020, 8, 8444.
- Nanosilver mitigates biofilm formation via FapC Amyloidosis Inhibition. Zil-e Huma, Ibrahim Javed, Zhenzhen Zhang, Hajira Bilal, Yunxiang Sun, Syed
- Zajif Hussain, Thomas P. Davis, †, Daniel E. Otzen, Cornelia B. Landersdorfer, Feng Ding, Irshad Hussain* and Pu Chun Ke*. *Small*, 2020, 16, 1906674.
- Controlled Assembly of Cu/Co-oxide Beaded Nanoclusters on Thiolated Graphene Oxide Nanosheets for High Performance Oxygen Evolution Reaction. Akhtar Munir, Tanveer Ul Haq, Iqtidar Hussain, Irfan Ullah, Syed Zajif Hussain, Javed Iqbal, Ahsanulhaq Qurashi, Asma Rehman, Irshad Hussain*. *Chemistry – A European Journal*, 2020, 26(49), 11209.
- Controlled Engineering of Nickel Carbide Induced N-Enriched Carbon Nanotubes for Hydrogen and Oxygen Evolution Reactions in Wide pH Range. Akhtar Munir, Tanveer-ul-Haq, Murtaza Saleem, Anwar-Ul-Hamid, Syed Zajif Hussain, Falak Sher, Ahsanulhaq Qurashi, Asim Jalani, Irshad Hussain*. *Electrochimica Acta*, 2020, 341, 136032.
- Influence of W-doping on the optical and electrical properties of SnO₂ towards photocatalytic detoxification and electrocatalytic water splitting. Irfan Ullah, Akhtar Munir, Shoaib Muhammad, Saqib Ali, Nasir Khalid, Muhammad Zubair, Muhammad Sirajuddin, Syed Zajif Hussain, Sajjad Ahmed, Yaqoob Khan, Irshad Hussain*, Ali Haider*. *Journal of Alloys and Compounds*, 2020, 827, 154247.
- Controlled Development of Higher-Dimensional Nanostructured Copper Oxide Thin Films as Binder Free Electrocatalysts for Oxygen Evolution Reaction. Farhan Arshad, Akhtar Munir, Qasim Qayyum Kashif, Tanveer ul Haq, Javed Iqbal, Falak Sher, Irshad Hussain*. *International Journal of Hydrogen Energy*, 2020, 45(23), 16583.
- A proactive model on innovative biomedical applications of gold nanoparticles. Asma Irshad*, Maira Zahid, Tayyab Husnain, Abdul Qayyum Rao, Nadeem Sarwar, Irshad Hussain. *Applied Nanoscience* 2020, 10, 2453.

- Ultrasmall Co@Co(OH)₂ Nanoclusters Embedded in N-Enriched Mesoporous Carbon Network as Efficient Electrocatalysts for Durable Water Oxidation. Akhtar Munir, Tanveer ul Haq, Iqtidar Hussain, Ahsanulhaq Qurashi, Ubaid Ullah, Muhammad J. Iqbal, Irshad Hussain*. *ChemSusChem*, 2019, 12, 5117.
- Fabrication of Emulsion-Templated Poly(vinylsulfonic acid)-Ag Nanocomposite Beads with Hierarchical Multimodal Porosity for Water Cleanup. Muhammad A. Mudassir, Syed Zajif Hussain, Syeda T. Asma, Haifei Zhang, Tariq M. Ansari*, Irshad Hussain*. *Langmuir* 2019, 35, 40, 13165.
- Porous hypercrosslinked polymer-TiO₂-graphene composite photocatalysts for visible-light-driven CO₂ conversion. Shaolei Wang, Min Xu, Tianyou Peng, Chengxin Zhang, Tao Li, Irshad Hussain, Jingyu Wang and Bien Tan*. *Nature Communications*, 2019, 10, 676.
- Hydrothermal synthesis of carbon nanodots from bovine gelatin and PHM3 microalgae strain for anticancer and bioimaging applications. Mishal Amjad, Maheen Iqbal, Amir Faisal, Arshad M. Junjua, Irshad Hussain, Syed Zajif Hussain, Hamed A. Ghramh, Khalid Ali Khan, and Hussain A. Janjua*. *Nanoscale Advances* 2019, 1, 2924.
- Carbon-dot wrapped ZnO nanoparticle-based photoelectrochemical sensor for selective monitoring of H₂O₂ released from cancer cells. Faria Khan, Naeem Akhtar, Nasir Jalal, Irshad Hussain, Rafal Szmigielski, Muhammad Qasim Hayat, Hafiz B. Ahmad, Waleed A. El-Said, Minghui Yang, Hussain Ahmed Janjua*. *Microchimica Acta*, 2019, 186, 127.
- Magnetic Hierarchically Macroporous Emulsion-Templated Poly(acrylic acid)-Iron Oxide Nanocomposite Beads for Water Remediation. Muhammad Ahmad Mudassir, Syed Zajif Hussain, Asim Jilani, Haifei Zhang, Tariq Mahmood Ansari*, Irshad Hussain*. *Langmuir* 2019, 35, 27, 8996.
- Combating antibiotic-resistant bacteria using nanomaterials. Akash Gupta, Shazia Mumtaz, Cheng-H. Li, Irshad Hussain* and Vincent M. Rotello*. *Chemical Society Reviews*, 2019, 48, 415.
- An efficient synthesis of ultrafine gold nanoparticles with tunable sizes in a hyper-crosslinked polymer for nitrophenol reduction. Jiang He, Shumaila Razzaque, Shangbin Jin, Irshad Hussain, and Bien Tan*. *ACS Applied Nanomaterials*, 2019, 2, 546.
- Ultrasmall Ni/NiO nanoclusters on thiol-functionalized and exfoliated graphene oxide nanosheets for durable oxygen evolution reaction. Akhtar Munir, Tanveer-ul-Haq, Ahsanulhaq Qurashi, Habib-ur-Rehman, Anwar Ul-Hamid, and Irshad Hussain*. *ACS Applied Energy Materials*, 2019, 2, 363.
- Design, characterization and appraisal of chemically modified polysaccharide based mucilage from *Ocimum basilicum* (basil) seeds for the removal of Cd(II) from spiked high-hardness ground water. Bilal A. Lodhi, Azhar Abbas, Muhammad A. Hussain*, Syed Z. Hussain, Muhammad Sher and Irshad Hussain. *Journal of Molecular Liquids*, 2019, 274, 15.
- Biosurfactant coated silver and iron oxide nanoparticles with enhanced anti-biofilm and anti-adhesive properties. Hafiza F. Khalid, Bushra Tehseen, Yasra Sarwar, Syed Z. Hussain, Waheed S.Khan, Zulfiqar A. Raza, Sadia Z. Bajwa, Antonios G. Kanaras, Irshad Hussain, and Asma Rehman*. *Journal of Hazardous Materials*, 2019, 364, 441.
- PVP-templated highly luminescent copper nanoclusters for sensing trinitrophenol and living cell imaging. Yulian Li, Lingyun Feng, Wei Yan, Irshad Hussain, Li Su, and Bien Tan*. *Nanoscale*, 2019, 11, 1286.
- Cationic Silver Nanoclusters as Potent Antimicrobials against Multidrug-Resistant Bacteria. Zil-e Huma, Akash Gupta, Ibrahim Javed, Riddha Das, Syed Z. Hussain, Shazia Mumtaz, Irshad Hussain*, and Vincent M. Rotello*. *ACS Omega*, 2018, 3, 16721.
- Metal Nanoclusters: New Paradigm in Catalysis for Water Splitting, Solar and Chemical Energy Conversion. Akhtar Munir, Khurram Joya, Syed Z. Hussain, Noor UA. Babar, Najeeb Ullah, Ahsanulhaq Qureshi, and Irshad Hussain*. *ChemSusChem*, 2018 (*In press*).
- Facile Synthesis of Hyper-crosslinked Hollow Microporous Organic Capsules for Electrochemical Sensing of Cu (II) ions. Shumaila Razzaque, Kewei Wang, Irshad Hussain and Bien Tan*. *Chemistry - A European Journal*, 2018, 24, 1.
- Polymeric nanocapsules embedded with ultra-small silver nanoclusters for synergistic pharmacology and improved oral delivery of docetaxel. Muhammad F. Sohail, Syed Z. Hussain, Ibrahim Javed, Hafiz S. Sarwar, Akhtar Nadhman, Zil-e-Huma, Mubashar Rehman,, Sarwat Jahan, Irshad Hussain* and Gul Shahnaz*. *Scientific Reports*, 2018, 8, 13304.
- Advancements in the oral delivery of Docetaxel: challenges, current state-of-the-art and future trends. Muhammad F. Sohail, Mubashar Rehman, Hafiz S. Sarwar, Sara Naveed, Omer Salman, Nadeem I. Bukhari, Irshad Hussain, Thomas J Webster, and Gul Shahnaz*. *International Journal of Nanomedicine*, 2018, 13, 3145.
- Mechanically robust superhydrophobic coating from sawdust particles and carbon soot for oil/water separation. Usama Zulfiqar, Tayyab Subhani, Irshad Hussain and Habib-ur-Rehman*. *Colloid and Surfaces A – Physicochemical and Engineering Aspects*, 2018, 539, 391.
- Mannosylated thiolated polyethylenimine nanoparticles for the enhanced efficacy of antimonial drug against Leishmaniasis. Hafiz S Sarwar, Sehreen Ashraf, Sohail Akhtar, Muhammad F Sohail, Syed Z Hussain, Muhammad Rafay, Masoom Yasinzai, Irshad Hussain, Gul Shahnaz*. *Nanomedicine*, 2018, 13, 1, 25.
- Dopamine coated Fe₃O₄ nanoparticles as enzyme mimics for the sensitive detection of bacteria. Shazia Mumtaz, Li-Sheng Wang, Syed Zajif Hussain, Muhammad Abdullah, Zill-e- Huma, Zafar Iqbal, Brian Creran, Vincent M. Rotello* and Irshad Hussain*. *Chemical Communications*, 2017, 53, 12306.
- Development of silver nanoparticles decorated emulsion-templated hierarchically porous poly(1-vinylimidazole) beads for water treatment. Muhammad Ahmad Mudassir, Syed Zajif Hussain, Asma Rehman, Wasif Zaheer, Syeda Tasmia Asma, Asim Jilani, Mohammad Aslam, Haifei Zhang, Tariq Mahmood Ansari,* Irshad Hussain.* *ACS Applied Materials & Interfaces*, 2017, 9, 24190.

- Layered microporous polymers by solvent knitting method. Shaolei Wang, Chengxin Zhang, Yu Shu, Shulan Jiang, Qi Xia, Linjiang Chen, Shangbin Jin, Irshad Hussain, Andrew I. Cooper, Bien Tan*. *Science Advances*, 2017, 3, e1602610.
- Synthesis of water-soluble and highly fluorescent gold nanoclusters for Fe³⁺ sensing in living cells using fluorescence imaging. Jianqiao Zhang, Chen Cai, Shumaila Razzaque, Irshad Hussain, Qunwei Lu and Bien Tan*. *Journal of Materials Chemistry B*, 2017, 5, 5608.
- Facile method to synthesize dopamine-capped mixed ferrite nanoparticles and their peroxidase-like activity. Shazia Mumtaz, Li-Sheng Wang, Muhammad Abdullah, Syed Zajif Hussain, Zafar Iqbal, Vincent M Rotello* and Irshad Hussain.* *Journal of Physics D: Applied Physics*, 2017, 11LT02.
- Development of functionalized hollow microporous organic capsules encapsulating morphine – In-vitro and in-vivo study. Shumaila Razzaque, Chen Cai, Qunwei Lu, Feng-Zhen Huang, Yu-Sang Li, He-Bin Tang, Irshad Hussain and Bien Tan*. *Journal of Materials Chemistry B*, 2017, 5, 742.
- Folate grafted thiolated chitosan enveloped nanoliposomes with enhanced oral bioavailability and anticancer activity of docetaxel. Farhan Sohail, Ibrahim Javed, Syed Zajif Hussain, Shoaib Sarwar, Sohail Akhtar, Akhtar Nadhman, Salma Batool, Nadeem Irfan Bukhari, Rahman Shah Zaib Saleem, Irshad Hussain* and Gul Shahnaz.* *Journal of Materials Chemistry B*, 2016, 4, 6240.
- Hydrophilic nanoparticles packed in oral tablets can improve the plasma profile of short half-life hydrophobic drugs. Faisal Usman, Ibrahim Javed, Syed Zajif Hussain, Nazar Muhammad Ranjha, Irshad Hussain. *RSC Advances*, 2016, 6, 94896.
- In-situ synthesis of bi-modal hydrophobic silica nanoparticles for oil-water separation. Usama Zulfiqar, Syed Zajif Hussain, Muhammad Awais, Muhammad Mohsin Jalil Khan, Irshad Hussain, S. Wilayat Husain, Tayyab Subhani. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 2016, 508, 301.
- Catalysis by multifunctional polyelectrolyte capsules. Syed Zajif Hussain, Mikhail V. Zyuzin, Irshad Hussain, Wolfgang J. Parak, Susana Carregal-Romero. *RSC Advances*, 2016, 6, 81569
- Gold nanoparticles supported on fibrous silica nanospheres (KCC-1) as efficient heterogeneous catalysts for CO oxidation. Ziyauddin S. Qureshi, Pradip B. Sarawade, Irshad Hussain, Haibo Zhu, Hind Al-Johani, Dalaver H. Anjum, Mohamed Nejib Hedhili, Niladri Maity, Valerio D'Elia, Jean-Marie Basset*. *CHEMCATCHEM*, 2016, 8, 1671.
- Design and utility of metal/metal oxide nanoparticles mediated by thioether end-functionalized polymeric ligands. Shumaila Razzaque, Syed Zajif Hussain, Irshad Hussain* and Bien Tan.* *Polymers*, 2016, 8, 156.
- Atomically monodisperse nickel nanoclusters as highly active electrocatalysts for water oxidation. Khurram Joya,* Lutfan Sinatra, Lina G. AbdulHalim, Chakra P. Joshi, Mohamed Nejib Hedhili, Osman M. Bakr and Irshad Hussain.* *Nanoscale*, 2016, 8, 9695.
- Lecithin-gold hybrid nanocarriers as efficient and pH selective vehicles for oral delivery of diacerein – In-vitro and in-vivo study. Ibrahim Javed, Syed Zajif Hussain, Atif Shahzad, Jahanzeb M. Khan, Habib-ur-Rehman, Mubashar Rehman, Faisal Usman, Muhammad T. Razi, Muhammad Raza Shah and Irshad Hussain.* *Colloids and Surfaces B - Biointerfaces*, 2016, 141, 1.
- Polysaccharide based superabsorbent hydrogel from Mimosa Pudica: Swelling-deswelling and drug release. Gulzar Muhammad, Muhammad A. Hussain*, Muhammad Umer Ashraf, Muhammad Tahir Haseeb, Syed Zajif Hussain and Irshad Hussain. *RSC Advances*, 2016, 6, 23310.
- Metal nanoparticles assisted polymerase chain reaction for strain typing of *Salmonella typhi*. Asma Rehman, Yasra Sarwar, Zulfiqar Ali Raza, Syed Zajif Hussain, Tanveer Mustafa, Waheed S Khan, Muhammad Afzal Ghauri, Abdul Haque and Irshad Hussain.* *Analyst*, 2015, 140, 7366.
- Synthesis, characterization and evaluation of lecithin based nanocarriers for enhanced pharmacological and oral pharmacokinetic profile of amphotericin B. Ibrahim Javed, Syed Zajif Hussain, Irfan Ullah, Imran Khan, Muhammad Ateeq, Gul Shahnaz, Habib ur Rehman, Muhammad T. Razi, Raza Shah and Irshad Hussain.* *Journal of Materials Chemistry B*, 2015, 3, 8359.
- Emulsion-templated poly(acrylamide)s by using polyvinyl alcohol (PVA) stabilized CO₂-in-water emulsions and their applications in tissue. Wei Luo, Ran Xu, Yunfei Liu, Irshad Hussain, Qunwei Lu and Bien Tan*. *RSC Advances*, 2015, 5, 92017.
- Controlled synthesis of uniform palladium nanoparticles on novel micro-porous carbon as a recyclable heterogeneous catalyst for the Heck reaction. Kunpeng Song, Peng Liu, Jingyu Wang, Lei Pang, Jian Chen, Irshad Hussain, Bien Tan and Tao Li. *Dalton Transactions* 2015, 44, 13906.
- Novel POSS-based organic-inorganic hybrid Porous materials and their applications in gas storage. S. Wang, L. Tan, C. Zhang, Irshad Hussain and Bien Tan*. *Journal of Materials Chemistry A*, 2015, 3, 6542.
- From porous gold nanocups to porous nanospheres and solid particles – A new synthetic approach. Ayesha Ihsan, Habib Katsiev, Noktan Alyami, Dalaver H. Anjum, Waheed S. Khan and Irshad Hussain.* *Journal of Colloid and Interface Science*, 2015, 446, 59.
- Voltammetric detection of As (III) with Porphyridium cruentum based modified carbon paste electrode biosensor. M. Zaib, A. Saeed*, I. Hussain, M.M. Athar, M. Iqbal. *Biosensors and Bioelectronics*, 2014, 62, 242.
- Hollow microporous organic capsules loaded with highly dispersed Pt nanoparticles for catalytic applications. Xinjia Yang, Kunpeng Song, Liangxiao Tan, Irshad Hussain, Tao Li and Bien Tan*. *Macromolecular Chemistry and Physics*, 2014, 215, 1257.

- Multifunctional microporous polymers. Buyi Li, Zhenhong Guan, Xinjia Yang, Wei David Wang, Wei Wang, Irshad Hussain, Kunpeng Song, Bien Tan* and Tao Li*. *Journal of Materials Chemistry A*, 2014, 2, 11930.
- Metal Ions in the context of nanoparticles towards biological applications. Carolina Carrillo-Carrion, Moritz Nazarenus, Sara Sánchez Paradinas, Susana Carregal-Romero, Maria Jesus Almendral, Manuel Fuentes, Beatriz Pelaz, Pablo del Pino, Irshad Hussain, Martin Clift, Barbara Rothen-Rutishauser, Xing-Jie Liang and Wolfgang Parak*. *Current Opinion in Chemical Engineering*, 2014, 4, 88.
- Synthesis of cellulose-metal nanoparticle composites -Development and comparison of different protocols. Sumaira Ashraf, Saif-ur-Rehman, Falak Sher, Zafar M. Khalid, Mazhar Mahmood, and Irshad Hussain.* *Cellulose*, 2014, 21, 395 (Front cover art).
- Synthesis of highly stable and water dispersible Ag₄₄(SR)₃₀ nanoclusters. Lina G. Abdulhalim, Sumaira Ashraf, Nuwan Kothalawala, Khabiboulakh Katsiev, Dalaver H. Anjum, Sikandar Abbas, Francesco Stellacci, Amala Dass, Irshad Hussain,* and Osman M. Bakr.* *Journal of Materials Chemistry A*, 2013, 01, 10148.
- Highly water-soluble magnetic iron oxide (Fe₃O₄) nanoparticles for drug delivery: Enhanced in vitro therapeutic efficacy of doxorubicin and MION conjugates. Irfan Majeed, Qunwei Lu, Zhen Li, Irshad Hussain,* Muhammad Nawaz Tahir, Wolfgang Tremel, and Bien Tan.* *Journal of Materials Chemistry B*, 2013, 01, 2874.
- Hydrogen storage and PL properties of novel Cd/CdO shelled hollow microspheres prepared under NH₃ gas environment. Waheed S. Khan*, Chuanbao Cao, Faheem K. Butt, Zulfiqar Ali, Zahid Usman, Ghulam Nabi, Ayesha Ihsan, Asma Rehman, Irshad Hussain, M. Tanveer, and Sajad Hussain. *International Journal of Hydrogen Energy*, 2013, 38, 2332.
- Protein-mediated synthesis, pH-induced reversible agglomeration, toxicity and cellular interaction of silver nanoparticles. Sumaira Ashraf, Azhar Zahoor Abbasi, Christian Pfeiffer, Syed Zajif Hussain, Zafar M. Khalid, Pilar Rivera Gil, Wolfgang J. Parak, and Irshad Hussain.* *Colloids and Surfaces B – Biointerfaces*, 2013, 102, 511.
- Facile and surfactant-free preparation of highly blue fluorescent gold nanoclusters in organic media. Xin Huang, Buyi Li, Luo Li, Hui Zhang, Irfan Majeed, Irshad Hussain* and Bien Tan.* *Journal of Physical Chemistry C*, 2012, 116, 448.
- Control of surface tension at liquid-liquid interfaces using nanoparticles and nanoparticle-protein complexes. Subinoy Rana, Xi Yu, Debabrata Patra, Daniel F. Moyano, Oscar R. Miranda, Irshad Hussain and Vincent M. Rotello*. *Langmuir*, 2012, 28, 2023.
- Photoreductive synthesis of water-soluble fluorescent metal nanoclusters. Hui Zhang, Xin Huang, Luo Li, Gaowen Zhang, Irshad Hussain, Zhen Li, and Bien Tan*. *Chemical Communications*, 2012, 48, 567.
- Facile preparation of size-controlled gold nanoparticles using versatile and end-functionalized thioether polymer ligands. Xin Huang, Buyi Li, Hui Zhang, Irshad Hussain, Liyun Liang and Bien Tan*. *Nanoscale*, 2011, 3, 1600.
- In-Situ growth of gold nanoparticles on latent fingerprints – From forensic applications to inkjet printed nanoparticle patterns. Irshad Hussain,* Syed Zajif Hussain, Habib-ur-Rehman, Ayesha Ihsan, Asma Rehman, Zafar M. Khalid, Mathias Brust and Andrew I. Cooper. *Nanoscale*, 2010, 2, 2575.
- Emulsions-directed assembly of gold nanoparticles to molecularly-linked and size-controlled spherical aggregates. Irshad Hussain,* Haifei Zhang, Mathias Brust, Justas Barauskas, Andrew I. Cooper. *Journal of Colloid and Interface Science*, 2010, 350, 368.
- Synthesis and use of self-assembled rhamnolipid microtubules as template for gold nanoparticles assembly to form porous gold microstructures. Asma Rehman, Zulfiqar Ali Raza, Saif-ur-Rehman, Zafar M. Khalid, Chandramouleeswaran Subramani, Vincent M. Rotello and Irshad Hussain.* *Journal of Colloid and Interface Science*, 2010, 347, 332
- Electron microscopy studies of the thermal stability of gold nanoparticle arrays. Roger Ristau, Ramchandra Tiruvalam, Patrick L. Clasen, Edward P. Gorskowski, Martin P. Harmer & Christopher J.Kiely*, and Irshad Hussain & Mathias Brust. *Gold Bulletin*, 2009, 42, 133.
- Controlled step growth of molecularly linked gold nanoparticles – from metallic monomers to dimers to polymeric nanoparticle chains. Irshad Hussain,* Mathias Brust, Justas Barauskas and Andrew I. Cooper. *Langmuir*, 2009, 25, 1934.
- Freeze-align and heat-fuse: Microwires and networks from nanoparticle suspensions. Haifei Zhang, Jun-Young Lee, Adham Ahmed, Irshad Hussain, and Andrew I. Cooper*. *Angew. Chem. Int. Ed.* 2008, 47, 4573.
- Site-specific ligation of DNA-modified gold nanoparticles activated by the restriction enzyme StyI. Antonios G. Kanaras, Zhenxin Wang, Irshad Hussain, Mathias Brust, Richard Cosstick, and Andrew D. Bates*. *Small*, 2007, 1, 67.
- Design of polymeric stabilizers for size-controlled synthesis of mono-disperse gold nanoparticles in water. Zhenxin Wang, Bien Tan, Irshad Hussain, Nicholas Schaeffer, Mark Wyatt, Mathias Brust and Andrew I. Cooper*. *Langmuir*, 2007, 2, 885.
- Formation of spherical nanostructures by controlled aggregation of gold colloids. Irshad Hussain,* Zhenxin Wang, Andrew I. Cooper and Mathias Brust. *Langmuir*, 2006, 22, 2941.
- Synthesis of hierarchically porous inorganic–metal site-isolated nanocomposites. Haifei Zhang, Irshad Hussain, Mathias Brust, and Andrew I. Cooper*. *Chemical Communications*, 2006, 24, 2539.
- Aligned two and three-dimensional structures by directional freezing of polymers and nanoparticles. Haifei Zhang, Irshad Hussain, Mathias Brust, Micheal F. Butler, Steven P. Rannard and Andrew I. Cooper*. *Nature Materials*, 2005, 4, 787.
- A new Pt-Ru model system to study the bifunctional mechanism of electrocatalysis. Christina Roth, Adam J. Papworth, Irshad Hussain, Richard J. Nichols and David J. Schiffrin. *Journal of Electro-Analytical Chemistry*, 2005, 581, 79.

- Size-controlled synthesis of near-monodisperse gold nanoparticles in the 1-4 nm range using polymeric stabilizers. Irshad Hussain, Susan Graham, Zhenxin Wang, Bien Tan, Steven P. Rannard, David C. Sherrington, Andrew I. Cooper* and Mathias Brust*. *Journal of the American Chemical Society*, 2005, 127, 16398.
- Emulsion-templated gold beads using gold nanoparticles as building blocks. Haifei Zhang, Irshad Hussain, Mathias Brust and Andrew I. Cooper*. *Advanced Materials*, 2004, 16, 1, 27 (*Front cover art*).
- Fullerene-linked Pt nanoparticle assemblies. Christina Roth, Irshad Hussain, Maryam Bayati, Richard J. Nichols and David J. Schiffrin*. *Chemical Communications*, 2004, 1532.
- Rational and combinatorial design of peptide capping ligands for gold nanoparticles. Raphael Levy, Nguyen T. K. Thanh, Christopher R. Doty, Irshad Hussain, Richard J. Nichols, David J. Schiffrin, Mathias Brust, and David G. Fernig*. *Journal of the American Chemical Society*, 2004, 126, 10076.
- Preparation of acrylate-stabilized gold and silver hydrosols and gold-polymer composite films. Irshad Hussain, Mathias Brust*, Adam J. Papworth and Andrew I. Cooper*. *Langmuir*, 2003, 19, 4831.