Research Work Title

The Development of Nanocarriers for Targeted Drug Delivery

Researcher | Muhammad Raza Shah

Country | The Islamic Republic of Pakistan

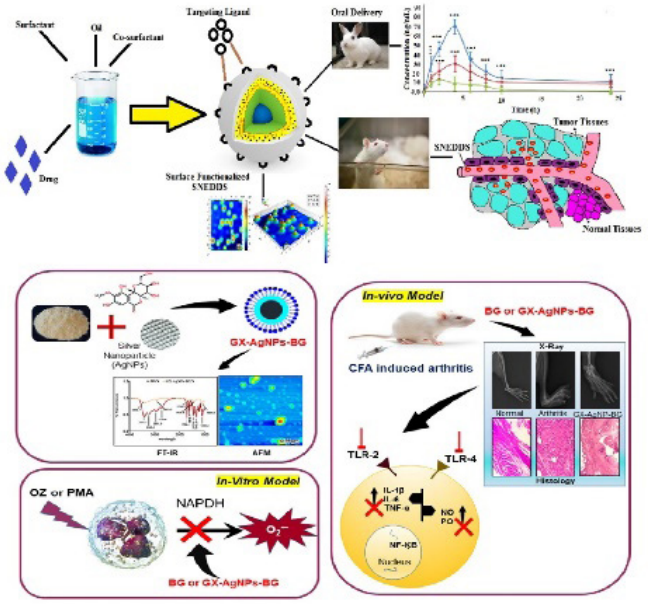
Field | Biocompatible Materials

Scientific Affiliation | International Centre for Chemical and Biological Sciences, Pakistan

Abstract

Professor Muhammad Raza Shah's area of study focuses on using biocompatible materials at the nanoscale for drug delivery purposes. The main aim is to improve the efficacy of therapeutic treatments and enhance biosensing capabilities. He actively involved in the development of nanocarriers specifically designed for targeted drug delivery. The ultimate objective is to reduce the side effects of active pharmaceutical ingredients throughout the treatment procedure. Professor Shah has achieved remarkable success in this field by utilizing various efficient nanocarriers such as polymeric nanocarriers, superparamagnetic nanoparticles, and lipid nanoparticles. Through these advancements, he has effectively utilized the size, shape, surface characteristics, and surface charge of custom-designed nanomedicines to enhance their efficacy and reverse resistance to drugs already available in the market. Additionally, Professor Shah has conducted extensive research on new drug candidates at the nanoscale to evaluate their therapeutic effectiveness and safety and published his research in various scientific journals. Furthermore, he has made significant contributions to the development of nano biosensors. These biosensors have proven instrumental in the molecular detection of biomarkers associated with disease diagnosis, reducing product contamination, and monitoring toxic analytes in blood samples.

Professor Muhammad Raza Shah has an impressive portfolio of over 460 research publications, showcasing his expertise and dedication to advancing the field of drug delivery using nanotechnology. In addition to his extensive research contributions, he has also been granted three patents in the United States for his innovative work. Professor Shah has extensive experience in conducting clinical trials. He has successfully managed 21 Phase-1 clinical trials (BE-PK) and served as the principal investigator for 05 phase-II clinical trials in the pharmaceutical filed. Additionally, he played a pivotal role in leading the Phase 1 clinical trial for the Sinopharm's company COVID-19 vaccine in Pakistan.



Research Work Title

Achieving sustainable development goals using multi-functional Nanomaterials

Researcher | Malek Maaza

Country of Residence | The Republic of South Africa

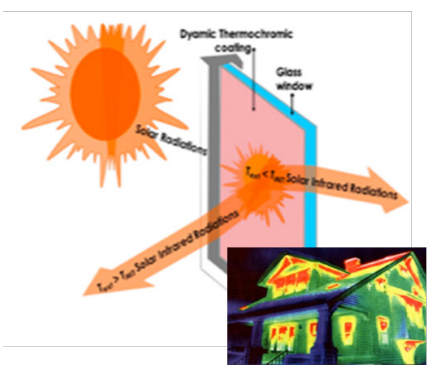
Field | Advanced Materials

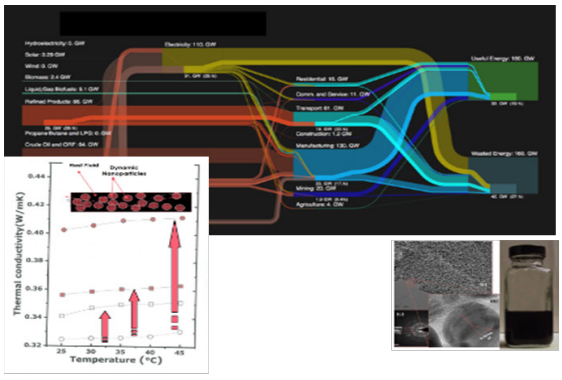
Scientific Affiliation | University of South Africa, South Africa

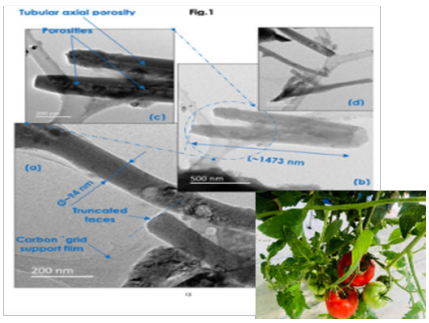
Abstract

As of today, approximately 55% of the global population lives in urban areas. It is estimated by 2050, this number reaches around 2.5 billion, with about 90% of the increase occurring in Asia & Africa. With such a significant rise in urban population and the concurrent impact of climate change on seasonal atmospheric temperatures, there are several numerous challenges related to achieving Sustainable Development Goals. In this context, Science, Technology and Innovation (STI) as well as Research and Development (R&D) play a crucial role in addressing these challenges within the realms of energy, water, and health. In the energy sector, the utilization of Vanadium-based thermochromic nano-coatings holds great potential for smart window applications. These coatings effectively regulate solar heat radiation without requiring any additional energy input, thus enabling green air-conditioning. Likewise, the application of nano-fluids as advanced coolants can greatly contribute to waste heat recovery. In addition, recent research has demonstrated that carbon dioxide (CO)2 can be utilized to bio-engineer several multifunctional carbonates. These carbonates exhibit properties such as effective fertilization response and high reflectivity similar to radiative cooling paint, and significant porosity and hardness, making them a promising Supplementary Compound Material (SCM) for cement industry. The purpose of this study is to highlight on the above-mentioned properties and their interconnections.

Professor Malik Maaza is a co-founder of the African Laser Centre and South African Nanotechnology Initiative, which was established in 2001. He has played a leading role in initiatives such as the Nanosciences African Network, the African Materials Research Society, and the African Light Source. Since 2013, he has been a professor at the University of South Africa and associated with iThemba LABS since 2005, a renowned scientific research center also known as the National Accelerator Centre.







Research Work Title

The Synthesis, Chemical Properties and Application of Unique Compounds Containing Rare-Earth Elements, Lithium and Boron

Researcher | Thomas Schleid

Country | Federal Republic of Germany

Field | Mineral Chemistry

Scientific Affiliation | Stuttgart University, Germany

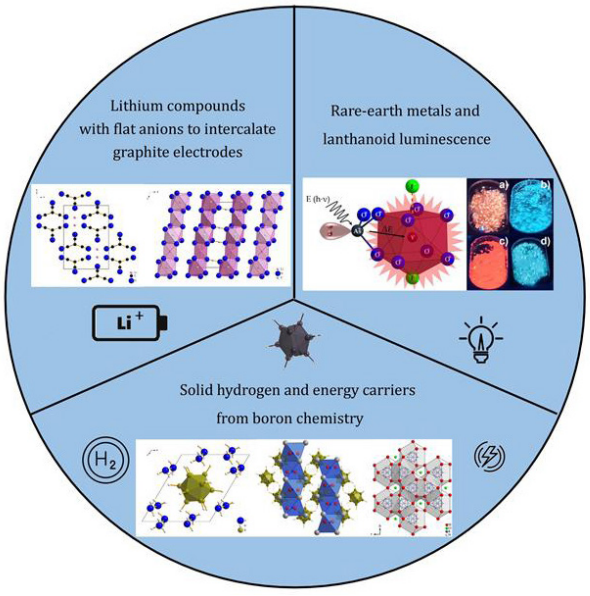
Abstract

Professor Thomas Schleid has successfully synthesized and characterized a total of 1035 new crystalline phases, consisting of 800 lanthanide, 100 boron, and 55 lithium compounds. These new compounds have a wide range of applications, including their use as ion conductors in batteries (such as sulfurized polypropylene as a cost-effective cathode material for high-capacity lithium-sulfur batteries and lithium thiocyanate), luminescent materials (like thallium hydroborate and Europium (II) Halide Oxoborates), and in hydrogen storage (such as ammonium and hydrazinium closo-hydroborates).

Part 1: Li+-cation conductors: Promising candidates: a) Lithium salts with soft complex anions, e.g. Li[CN], Li[OCN], Li[SCN], Li[N(CN)2] and Li[C(CN)3], all cigar-shaped or flat planar; b) Argyrodite-inspired ortho-thiophosphates(V) with participation of trivalent rare-earth metals, e.g. Li3RE[PS4]2, Li4RE[PS4]2Cl, Li6RE3[PS4]5 and Li9RE2[PS4]5.

Part 2: Heavy-metal phosphors: Tl3Cl[B12H12]: Blue Tl+ lone-pair luminescence, EuHCl and Eu5H2O2I4: Ligand-dependent Eu2+ broad-band luminescence, almost ligand-independent Ln3+ line-luminescence (Ln = Eu or Tb) in bulk or doped samples containing hard fluoride and oxoanions, e.g. YF[SeO3], Gd3F[SeO3]4, Y5F3[AsO3]4, La2F2[As2O5] with lone-pair antennae or YF[MoO4], YF[WO4] and YFMo2O7 with charge-transfer antennae.

Part 3: Solid-state hydrogen carriers: Ammonium and hydrazinium salts with hydro-closo-borate cage anions offer B–Hδ–···Hδ+–N dihydrogen bonds as preformed pathways for the irreversible release of elemental hydrogen (H2): (NH4)2[BnHn], (NH4)3X[BnHn], (N2H5)2[BnHn] and (N2H5)2[BnHn] · 2 N2H4 with X = Cl – I and n = 10 and 12.



Professor Thomas Schleid has been an active member of multiple professional organizations, such as the German Crystallographic Association (DGK) and the German Chemical Society (GDCh) where he served as the chairman of the Crystal-Chemistry Section from 2010 to 2015 and the Chemical Education Section from 2012 to 2016. Currently, Professor Schleid is serving as the president for the German Crystallographic Association, a position he has held since 2021.

Research Work Title

An Antioxidant Mechanism and Phytochemical Analysis of Plants

Researcher | İlhami GÜLÇİN

Country | Republic of Türkiye

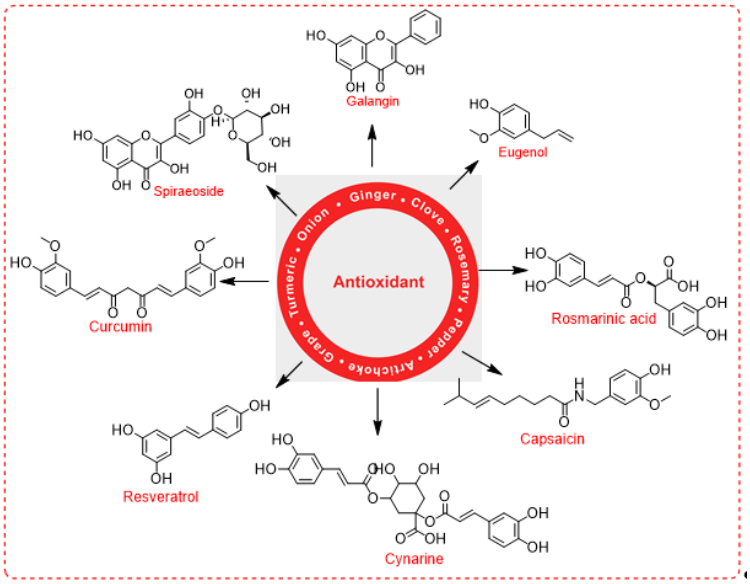
Field | Biochemistry

Scientific Affiliation | Ataturk University, Türkiye

Abstract

Professor İlhami GÜLÇİN's research has primarily focused on two key areas in the field of biochemistry. The first area of study involves exploring the antioxidant properties of various aromatic and medicinal plants, as well as phytochemicals and synthetic phenolic compounds. Through his investigations, he has identified and examined the antioxidant capacity of compounds such as caffeic acid, curcumin, resveratrol, and eugenol. These findings have garnered significant attention from the scientific community. The second aspect of Professor GÜLÇİN's work revolves around the purification, characterization, and inhibition properties of some metabolic enzymes associated with various global diseases. In pursuit of this, he has developed novel inhibitors for therapeutic purposes, with a particular purpose on carbonic anhydrase isoenzymes linked to conditions such as glaucoma, epilepsy, mountain sickness, stomach and duodenal ulcers, idiopathic intracranial hypertension, osteoporosis, and other neurological disorders. Additionally, Prof. GÜLÇİN's research has showcased the inhibitory effects of various inhibitors on acetylcholinesterase, butyrylcholinesterase, α-glycosidase, and α-amylase, as well as their potential in treating the aforementioned diseases.

Professor İlhami GÜLÇİN's extensive body of work, comprising 500 SCI-covered articles, has earned him the distinction of being a "Highly Cited Researcher" in 2014, 2015, and 2018, as recognized by Clarivate. Further, Professor GÜLÇİN is a distinguished member of the Turkish Academy of Sciences (TÜBA).



Ministry of Science, Research & Technology
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The Laureates of the 37th Khwarizmi International Award