

MUHANNA K A AL-MUHANNA, PhD, MPhil

Mobile: +966560022888

Off: +966 11 4813802 / 4813802, Fax: +966 11 4814574

E-mail: mmuhanna@kacst.edu.sa, drmmuhanna@gmail.com

Associate Research Professor-Pharmaceutical Chemistry & Nanotechnology
Materials Sciences Research Institute, The National Centre for Advanced Materials
Technologies, King Abdul Aziz City for Science & Technology (KACST)

PO Box: 6086, Riyadh 11442, Kingdom of Saudi Arabia

SENIOR RESEARCHER

A self-motivated and precision-centered scientific research professional with extensive experience in nano-medicine & pharmaceutical sciences along with wide-ranging scientific knowledge in working with polymers for Potential-Drug delivery systems using advanced characterization techniques. Proven success in developing microfluidic devices, from conception to product launch that substantially improve assay development processes. Recognized as a key contributor to develop research coordination in various fields of nanotechnology, medical and pharmaceutical sciences, between local and global institutions for the advantages of technology transfer and development. Expertise in conducting and performing assays consistently, preparing and optimizing protocols, identifying and troubleshooting experimental issues and determining appropriate solutions.

- Identified and bio-medically characterized research (both in vitro and in vivo) as well as academic basic life science research. Adept at readily gathering and translating complex requirements into viable solutions.
- An articulate and bi-lingual communicator can fluently speak the language of people and scientific research with the ability to anchor publication record and translate leadership's vision into executable plans for teams to follow.
- Demonstrated ability to work in fast-paced team environment complimented by accomplishing multiple challenging tasks efficiently.

AREAS OF EXPERTISE

Adaptability & Flexibility • Best Practices • Research & Development • Vesicular Drug Delivery System • Molecular Biophysics • Quantitative & Qualitative Analysis • Effective Technical Writing • Pharmaceutical & Medical Applications • Research & Coordination of Projects • Technology Development • Advanced Characterization Techniques • Physical & Analytical Chemistry • Biotechnology Strategic Planning • Pharmaceutical Industries

ACADEMIC BRIEF

- **PhD in Pharmaceutics, Molecular Biophysics (Drug Delivery Systems)**, School of Health and Life Science, College of Medicine, King's College London, London University, UK
- **M. Phil. in Medicinal Chemistry**, University of Southampton, UK
- **BSc in Chemistry**, King Abdulaziz University, Jeddah, Saudi Arabia

BUSINESS TRAINING, CONFERENCES , COURSES & WORKSHOPS

- **Certified Corporate Governance Specialist, October 2021.**
- **The General Authority for Small and Medium Enterprises - Monsha'at : 2020**
 - Training Program "Enterprise Growth"
 - Workshop on "Business plan for financing".
 - Workshop on "How to Apply for Tenders and Government Procurement"
 - Workshop on "Legal Entity Identifier and Financial Risk Reduction"
 - Workshop on "Financing Solutions for Small and Medium Enterprises"
 - Workshop on "How to accelerate the closing of the financial round"

- Workshop on "Conditions and Funding Programs"
- Workshop on "Preparing to Attract Venture Capital, and the Most Important Items for Negotiation"
- Workshop on "Economic Feasibility Study"
- Venture Capital Funds and Private Equity Workshop
- Workshop on "Financing Products, Methods and Financing Solutions"
 - Workshop on "Basics of Supporting Small and Medium Enterprises when Applying for a Financing"
- **Eventivus Corporation, Meraas "مرااس" Digital Encounters:**
 - An "experienced certificate" from the Eventis Foundation for successfully attending a series of Meraas meetings for a period of one month from 08/17/2020 to 09/16/2020.
 - The most important criteria for choosing partners.
 - Project presentation skills and investor persuasion.
 - Business ideas and investment solutions to support your project.
 - Achieving financial stability for small and medium enterprises.
 - Rapid growth of startups.
 - Entrepreneurial Management Strategies.
 - Attracting distinguished human cadres and its impact on business success.
 - Crisis management strategies and risk avoidance.
 - Operational planning for managing and developing emerging projects.
 - Creating and developing ideas and converting them into projects.
 - Development and enterprise development tools.
- **Business Pro (*Development with Different Vision*)**
 - Attending and completing the **Ideaathon** Ideas Challenge workshop, which was held from 12-22 July 2020
 - The 10 Strategies for Leadership in Crisis, 10 September 2020.
 - Enterprise Challenge Camp, 26-30 December.

SCIENTIFIC TRAINING, CONFERENCES & WORKSHOPS

- The 4th Saudi International Nanotechnology Conference (SINC 2016), Oct. 25–27, 2016, at King Fahad University for Petroleum and Minerals (KFUPM) Dehran, KSA. (The 1st to the 3rd nanotechnology conferences were held at KACST from 2010 every two years by the National Nanotechnology Centre.
- (International Light Scattering Colloquium), Wyatt Technology, Nov. 3 – 4, 2015, Santa Barbara, US.
- The 5th Annual Saudi International Technology Incubation Conference, Nov. 5 – 6, 2013, KACST, Riyadh, Saudi Arabia.
- Participated in American Association of Pharmaceutical Sciences AAPS National Biotechnology Conference, May 12, 2011, San Francisco, CA, US.
- Participated in the conference on (Clinical Trials in CNS 2010), Nov. 5, 2010, London, United Kingdom.
- Saudi International Technology Incubation Conference, Oct. 11–12, 2010, Riyadh, Saudi Arabia.
- Participated in the conference on (Optical Techniques and Nano Tools for Material and Life Sciences), June 15 – 21, 2010, Minsk, Belarus.
- Workshop in “Applied Project Management”, May 24 – 28, 2010, KACST, Riyadh, Saudi Arabia.
- Scientific visit to The National Academy of Science of Belarus, Aug. 2009 Minsk, Belarus.

- Workshop & Conference on (BIT 2nd World Congress of Industrial Biotechnology), 2009, in Seoul Korea.
- Conference on (International Chemistry), Oct. 2008, Amman, Jordan.
- Scientific Visit, (Technology Transfer & Development), Biotechnology Projects, Mar. 23–28 2008, Biopolis, the A* Agency for Science & Technology in Singapore, Singapore.
- Conference on (The Asian Bio Process Manufacturing), Nov. 24–28, 2007, Kuala Lumpur, Malaysia.
- Conference on (Nanotechnology) at King Saud University, Oct. 28 – 29, 2007, Riyadh, Saudi Arabia.
- Conference on (Bio Technology Incubators), May 5 – 13, 2007, Cambridge, UK.
- Participated as a Team Member in (Planning and Proposing the Establishment of the New “state-of-the-art” Biotechnology Building) in King Abdulaziz City for Science & Technology, 2007-2009.
- Workshop on (NANO Technology & Applications), Non-destructive testing NDT, KACST, Riyadh, Saudi Arabia, 2006.
- Participated as a Team Member in Planning and Proposing the Establishment of the “state-of-the-art” Clean Room at the National Nanotechnology Centre in King Abdulaziz City for Science & Technology, 2008-2010.

CURRENT RESEARCH ACTIONS

Co-Investigator: Developed technology and organized manufacture biocides on basis polyhexamethylene guanidine derivative, through collaboration with Institute of Chemistry of New Materials and The Academy of Science of Belarus.

Co-Investigator: Designed vesicular drug delivery system crosses the blood brain barrier bb for the treatment of the central nervous systems diseases, such as of Alzheimer’s disease, KACST awarded grant.

Principal Investigator: Established experimental methods of molecular engineering to modify planar surfaces with mono- and multimolecular films. Oversaw Functional Nano-structural coverings, anti-frictional, bio-sensing, magnetic Project while coordinating with the Institute of Chemistry of New Materials, The Academy of Science of Belarus.

Principal Investigator: Formulated methods of manipulation and assembly of micro particles and carbon nanotubes with optical tweezers and assessed possibility of application for fabrication of photonic materials and nano-engineering.

Principal Investigator: Synthesized magnetic, gold, silver and polymerinorganic composite Nano- and submicron particles and its functionalization by bioactive substances.

Co-Investigator: Expertly utilized anodic aluminum oxide templates to produce novel & photo responsive molecular crystal nanorods and nanotubes, jointly with the Medical College at National Guard Hospital, KACST awarded grant.

Principal Investigator, Targeting nanoparticles to tumor cell lines while working with the Northwestern University, Chicago, United States (Centre of Excellence of Bio-Nanotechnology Drug Delivery).

CAREER REVIEW

National Center for Composite and High Performance Materials Materials Science Research Institute, King Abdulaziz City for Science and Technology	2020 – Present
National Nanotechnology Centre, Materials Science Research Institute	2009 – 2019
Administration Affairs of the National Nanotechnology Research Institute <i>Deputy Director</i>	2012 – 2014
The Technology Innovation Centers (TICs) at KACST <i>Project Implantation Manger</i>	2010 – 2011
KACST Nanotechnology Incubator <i>Project Implantation Manager</i>	2009 – 2011
Administration Affairs of the National Nanotechnology Research Institute <i>Deputy Director</i>	2009 – 2011
Joint KACST-Northwestern University, Chicago <i>Projects Coordinator</i>	2009 – 2011
YJS Legal, London <i>Scientific, Pharmaceuticals and Medical Patents Consultant</i>	2005 – 2010

Natural Resources & Environmental Research Inst., King Abdulaziz City for Sc. & Tech. <i>Researcher & Principal Investigator/ Assistant Research Professor</i>	2007 – 2009
KACST Biotechnology Incubator <i>Project Implantation Manager</i>	2009 – 2011
School of Biomedical Sciences, King's College London <i>Postdoctoral Research Fellow</i>	2005 – 2007
Dins International Ltd (UK) <i>Marketing Director, Drugs and Pharmaceuticals Technology</i>	2005 – 2007
Future Trusts Industries (FTI), London <i>Marketing Executive & Student Advisor</i>	2002 – 2007
Al-Kawther Water Ind. Co., Jeddah <i>Laboratory Assistant Manager</i>	1996

CONSULTATIONS & MEMBERSHIPS

- Team member in National Planning & Proposing for establishing the state of art Clean Room at the National Nanotechnology Center at King Abdulaziz City for Science & Technology, 2008-2013.
- Project Manager Team, KACST, Implantation of the Biotechnology Incubator (BioIncu-Badir), 2009 – 2011.
- Project Manager Team, KACST, Implantation of the Technology Innovation Centers (TIC), April 2010 – Dec 2010.
- Member of the “National Health and Medical and Research Strategic Planning Committee” at King Abdulaziz City for Science & Technology, King Faisal Specialist Hospital and Medical Research and Ministry of Economy and Planning, Riyadh, Saudi Arabia, 2009 – 2011.
- Team member of the “National Planning & Proposing for establishing the new state of art Biotechnology Building” at King Abdulaziz City for Science & Technology, 2007-2010.
- Member of the “National Strategic Planning of the National Education Eco Systems (NEE)” at King Abdulaziz City for Science & Technology and Ministry of Economy and Planning, Riyadh, Saudi Arabia, 2010-2012.
- Member of the “National Biotechnology Strategic Planning Committee” at King Abdulaziz City for Science & Technology and Ministry of Economy and Planning, Riyadh, Saudi Arabia, 2010-2012.
- **Development Consultant, Muhanna Company for Agriculture and Trade, October 2000- to present**

PUBLICATIONS

PATENTS

(A method for producing magnetic Nano sorbents on the basis of hydroxyapatite for biologically active compounds binding), **Muhanna K. Al-Muhanna** et al. Jointly between KACST and the Institute of Chemistry of New Materials of the National Academy of Science.

(A method for producing magnetic Nano sorbents for biologically active compounds binding), **Muhanna K. Al-Muhanna**, et al. Jointly between KACST and Institute of Chemistry of New Materials of the National Academy of Science.

(Methods for obtaining hydrosols of pectin-Ag nanocomposite) **Muhanna K. Al-Muhanna**, et al. Jointly between KACST and Institute of Chemistry of New Materials of the National Academy of Science.

(Controlling micro particles through a light field having controllable intensity and periodicity of maxima thereof), **T.S.M. Al-Saud, Muhanna K. Al-Muhanna**, et al. Application for a patent of the United States of America on the useful model Attorney Docket. **US 2013/0099108 A1, Dated April 23, 2013.**

PUBLISHED PAPERS IN ISI JOURNALS

- Toward allogeneizing a xenograft: Xenogeneic cardiac scaffolds recellularized with human-induced pluripotent stem cells do not activate human naïve neutrophils, *Journal of Biomedical Materials Research: Part B - Applied Biomaterials*, 22 September 2021, Reem S. Al-Hejailan, Razan H. Bakheet, Mashael M. Al-Saud, Mansour B. Al-Jufan, Hussain M. Al-Hindas, Somaya M. Al-Qattan, **Muhanna K. Al-Muhanna**, Ranjit S. Parhar, Walter Conca, Jan Hansmann, Kate S. Collison, Heike Walles and Futwan A. Al-Mohanna.
- Optical Characteristics and Structural Properties of 3-(p- Nitrophenyl)-5-phenyl-1H-pyrazole, *Journal of Electronic Materials*, 21 / 11/ 2018, A.O. Elzupir, M.K.M. Ali, R.K. Hussein, M.A. Ibrahim, Muhanna K. Al-Muhanna, K.H. Ibnaouf
- Molecular structure, frontier molecular orbital and spectral analysis of dimethylamino chalcones efficient lasing dyes, A.O. Elzupir, M.K.M. Ali, R.K. Hussein, M.A. Ibrahim, Muhanna K. Al-Muhanna, K.H. Ibnaouf, *Journal of Molecular Structure*, **12/ 10/ 2018**.
- (Immunogenicity of Candidate MERS-CoV DNA Vaccines Based on the Spike Protein), Sawsan S. Al-amri1, Ayman T. Abbas, Loai A. Siddiq, Abrar Alghamdi, Mohammad A. Sanki, **Muhanna K. Al-Muhanna**, Rowa Y. Alhabbab, Esam I. Azhar, Xuguang Li & Anwar M. Hashem, *Nature, Scientific Reports* 7, Article number: 44875, **March, 23, 2017**.
- (Associates of Thioalkyl Derivatives of 2-2 Arylamino-pyrimidine with Hydroxyapatite-based Nano composites), N. Eryomin A.V. Pietkovich, A.V. Abakshonok, Yu. V. Siniutich, Zh. V. Ignatovich, V.E. Agabekov, **Muhanna K. Al-Muhanna**, , *Russian Journal of General Chemistry*, **August 2016**, Vol. 86, No. 8, pp. 1886–1895.
- **Muhanna K. Al-Muhanna**, K.S. Hileuskaya, V.I. Kulikouskaya, A.N. Kraskouski, V.E. Agabekov, (*Preparation of Stable Sols of Silver Nanoparticles in Aqueous Pectin Solutions and Properties of the Sols*), *Colloid Journal*, **2015**, Vol. 77, No. 6, pp. 677–684.
- **Muhanna K. Al-Muhanna**, Malik Abdul Rub, Naved Azum, Sher Bahadar Khan, Abdullah M. Asiri, (*Self-Aggregation Phenomenon of Promazine Hydrochloride Under the Influence of Sodium Cholate Sodium Deoxycholate in Aqueous Medium*), *The Journal of Dispersion Science and Technology*, **1 June 2015**.
- **Muhanna K. Al-Muhanna**, Malik Abdul Rub, Naved Azum, Sher Bahadar Khan, Abdullah M. Asiri, (*Effect of Gelatin on Micellization and Microstructural Behavior of Amphiphilic Amitriptyline Hydrochloride Drug Solution: A Detailed Study*) , *The Journal of Chemical Thermodynamics*, **2015**, Vol. 80, pp. 112–122.
- Rabih O. Al-Kaysi, Lingyan Zhu, Maram Al-Haidar, **Muhannah K. Al-Muhannah**, Kheireddine El-Boubbou, Tarafah M. Hamdan, Christopher J. Bardeen, (*Chemical Reaction Method for Growing Photomechanical Organic Microcrystals*), *CrystEngComm*, **Jan 2015**, **Advance Article**.
- Lingyan Zhu, Fei Tong, Christopher Salinas, **Muhanna K. Al-Muhanna** ,Fook S. Tham, David Kisailus, Rabih O. Al-Kaysi, Christopher J. Bardeen, (*Improved Solid-State Photomechanical Materials By Fluorine Substitution of 9-Anthracene Carboxylic Acid*), *Chem. Mater.*, **2014**, Vol. 26 No. 20, pp. 6007–6015.
- Taehyung Kim, **Muhanna K. Al-Muhanna**, Salem d. Al Suwaidan, Rabiah Alkaysi, Christopher J. Bardeen, (*Photoinduced Curling of Organic Molecular Crystal Nanowires, Photoresposive Nanowires*), *Angewandte Chem*, **2013**, Vol. 125, pp. 1–6.
- **Muhanna K. Al-Muhanna**, S.K. Kurilkina, N.V. Belyi, N.S. Kazak, (*Energy Flow Patterns in an Optical Field Formed by a Superposition of Evanescent Bassel Light Beams*), *Journal of optics*, **2011**, Vol 13,10570, pp. 9-4.

PAPERS PRESENTED AND PUBLISHED IN INTERNATIONAL SEMINARS & CONFERENCES

A.V. Abakshonok, N.V. Karataiy, I.V. Paribok, A.N. Eryomin, V.E. Agabekov, **Muhanna K. Al-Muhanna**, (Langmuir Films Of Gold Sol In Reverse Micelles Of Aerosol OT), 7th International Conference on chemistry and chemical education, Research Institute for Physical-Chemical Problems of the Belarusian State University Chemical Department of the Belarusian State University, Minsk, Belarus, **Apr. 7 – 11, 2015**.

Taehyung Kim, **Muhanna K. Al-Muhanna**, Salem Al Suwaidan, Rabiah Alkaysi, Christopher J. Bardeen, (Photo-Induced Spontaneous Coiling and Bending of Molecular-Crystal Nanowires and Micro-Mulipods), Proceeding of the 4th International Conference on Nanotechnology: Fundamentals and Applications, Toronto, Ontario, Canada, Aug. 12 – 14, 2013, Paper No. 46. , Rabiah Muhanna, **Aug. 2013**.

Anatol A. Ryzhevich, Sergei V. Solonevich, Andrey G. Smirnov, Nikolai S. Kazak, Turki S.M. Al-Saud, **Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, Oral Presentation (Useful Light Fields with Intensity Minima), VI International Conference on Electronics and Applied Physics, Taras Shevchenko National University of Kyiv, Radiophysics Faculty, Kyiv, Ukraine, **Oct. 20 – 23, 2010**.

Anatol A. Ryzhevich, Sergei V. Solonevich, Andrey G. Smirnov, Nikolai S. Kazak, Turki S.M. Al-Saud, **Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, Oral Presentation (Laser Beam Transformation by Means of Biaxial Crystal), VI International Conference on Electronics and Applied Physics, Taras Shevchenko National University of Kyiv, Radiophysics Faculty, Kyiv, Ukraine, **Oct. 20 – 23, 2010**.

Anatol A. Ryzhevich, Sergei V. Solonevich, Andrei G. Smirnov, Nikolai S. Kazak, Turki S.M. Al-Saud, **Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, (Methods for Narrow Hollow Light Beams Formation), Proceedings of the International Conference on Optical Techniques and Nano-Tools for Material and Life Sciences (ONT4MLS-2010), Minsk, Belarus, **June 15 – 19, 2010**, Vol. 2, pp. 111-117

Muhanna K. Al-Muhanna, (Small-Angle Neutron Scattering Characterization of Nanopolymeric Surfactant Nanovesicles as Potential for Novel Drug Delivery Systems), International Conference on Optical Techniques and Nano-Tools for Material and Life Sciences (ONT4MLS-2010), Minsk, Belarus, **June 17, 2010**.

S.N. Kurilkina, V.N. Belyi, N.S. Kazak, **Turki S.M. Al-Saud, Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, (Application of Evanescent Bessel Light Beams Superposition for Testing Quality of Surfaces and Thin Dielectric Layers), Proceedings of the International Conference on Optical Techniques and Nano-Tools for Material and Life Sciences (ONT4MLS-2010), Minsk, Belarus, **June 15 – 19, 2010**, Vol. 1, pp. 38-48.

Anatol A. Ryzhevich, Sergei V. Solonevich, Nikolai S. Kazak, **Turki S.M. Al-Saud, Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, (Laser Beam Apodization with Biaxial Crystal), Proceedings of the International Conference on Optical Techniques and Nano-Tools for Material and Life Sciences (ONT4MLS-2010), Minsk, Belarus, **June 15 – 19, 2010**, Vol. 2, pp. 153-159.

Anatol A. Ryzhevich, Sergei V. Solonevich, Andrey G. Smirnov, Nikolai S. Kazak, Turki S.M. Al-Saud, **Muhanna K. Al-Muhanna**, Soliman H. Al-Khowaiter, (Useful Light Fields with Intensity Minim), Proceedings of the VI International Conference on Electronics and Applied Physics, Taras Shevchenko National University of Kyiv, Radiophysics Faculty, Kyiv, Ukraine, **October 20 – 23, 2009**, pp. 20-21.

Muhanna K. Al-Muhannam, M.J. Lawrence, (The Biophysicochemical Properties of the Aggregates Formed by Novel liposomes for Drug Delivery Systems), Poster abstract on the BIT 2nd World Congress of Industrial Biotechnology, **Apr. 5 – 7, 2009**.

Muhanna K. Al-Muhanna, M.J. Lawrence, (Novel Non-ionic Surfactants as a Vehicle for Drug Delivery System), Abstract on the 8th United Kingdom & Ireland Controlled Release Society Symposium, **Jan. 17, 2002**.

POSTER PRESENTATIONS

Kheireddine El-Boubbou, Rabih O. Al-Kaysi, **Muhannah K. Al-Muhannah**, Hassan M. Bahhari, Khalid AlSaad, Salem AlSuwaidan. Poster paper on (Novel Co-precipitation method to prepare colloidal monodisperse magnetic oxide nanoparticles for molecular and cellular imaging), Gordon Research Conferences, Biointerface Science, **June 15 – 20, 2014**.

N.A. Kassem, M.B. Segal, **Muhanna K. Al-Muhanna**, F.J. Fatani, R Deane. Presented poster abstract on (Thyroxine clearance from cerebrospinal fluid using V-C perfusion technique in rabbit), AAPS National Biotechnology Conference, San Francisco, USA, **May 12, 2011**.

N.A. Kassem, R. Deane, J.E. Preston, J.C. Thiery, **Muhanna K. Al-Muhanna**, F.J. Fatani. Presented poster abstract on (Effect of day length change on blood-CSF barrier function, using in situ brain perfusion technique in sheep), AAPS National Biotechnology Conference, San Francisco, USA, **May 12, 2011**.

Muhanna K. Al-Muhanna. Poster reports on (Laser beam apodization with biaxial crystal), International conference on "Optical Techniques and Nano-Tools for Material and Life Sciences (ONT4MLS-2010)", Minsk, Belarus, **June 18, 2010**.

To Be Published

Computational investigation of the binding mode, mechanism of action to find new EGFR inhibitor as anti-lung cancer compound from natural flavonoids through quantum mechanical descriptors and molecular docking.

RSC Advances (RSC)

Muhanna K. Al-Muhanna Q2

3-Substituted-2-oxindole derivatives: Design, synthesis and their anti-tuberculosis and radical scavenging dual-action studies **Chemistry Select (Wiley)**

Muhanna K. Al-Muhanna Q3

Oxindole derivatives: Design, synthesis and their anti-cancer studies

Bioorganic Chemistry

Muhanna K. Al-Muhanna Q1

Design, anticancer and antioxidant activities of indole curcumin derivatives: An in vitro and in silico studies, **European journal of pharmaceutical science (Wiley)**

Muhanna K. Al-Muhanna Q2

Design, anticancer and antioxidant activities of hydrazynylthiazole derivatives,

Pharmaceutical Research

Muhanna K. Al-Muhanna Q2

Allogeneizing a xenograft: xenogeneic cardiac scaffolds recellularized with human induced pluripotent stem cells do not activate human naïve neutrophils.

Journal of Biomedical Materials Research

Muhanna K. Al-Muhanna

Thyroxine efflux from cerebrospinal fluid to blood in sheep isolated perfused choroid plexus is mediated by Na⁺-taurocholate cotransporting polypeptide, multidrug resistance-associated proteins, organic anion transporting polypeptides, and monocarboxylate transporters".

PHAM Journal

Muhanna K. Al-Muhanna

Syntheses of tailor-made polysaccharides for drug delivery applications Tailor-Made Polysaccharides in Drug Delivery.

(Elsevier Science Publishing Co Inc) book chapter

Muhanna K. Al-Muhanna

Working Principle and Mechanism in Nanogenerators Nanogenerators: Basics, Design, Strategies and Applications **(The CRC Press, LLC is an American publishing group) Book chapter**

Muhanna K. Al-Muhanna