

Curriculum vitae (Updated 29/06/2017)

Ahmed Abd El-Fattah, Assistant Professor of Chemistry

Department of Materials Science, Institute of Graduate Studies and Research (IGSR), Alexandria University.

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Birth Date: 04/10/1976



EDUCATION

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| 2008 | Doctor of Philosophy in Chemical Sciences Department of Chemistry and Industrial Chemistry, <i>Pisa University, Pisa, Italy.</i> Dissertation: "Synthesis and Characterization of Nanopolymeric Materials for Active Agents Delivery Constructs". Supervisor: Prof. Emo Chiellini |
| 2003 | Master Degree in Materials Science Department of Materials Science, Institute of Graduate Studies and Research (IGSR), <i>Alexandria University, Alexandria, Egypt.</i> Dissertation: "Compatibilization of Recycled Plastics". Supervisor: Prof. Sherif Kandil |
| 1998 | Bachelor of Science in Chemistry and Physics Faculty of Science, <i>Alexandria University, Alexandria, Egypt.</i> |

PROFESSIONAL EXPERIENCE

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| 2008-present | Assistant Professor Department of Materials Science, Institute of Graduate Studies and Research (IGSR), Alexandria University, Alexandria, Egypt. |
| 2013-present | Assistant Professor ((Designated Lecturer) Department of Chemistry, Faculty of Science, Alexandria University, Alexandria, Egypt. Department of Dental Biomaterials, Faculty of Dentistry, Alexandria University, Alexandria, Egypt. |
| 2012 | Assistant Professor Coordinator of Chemistry Course, Foundation Year program, Batterjee Medical College for Science and Technology, Jeddah, Saudi Arabia. |

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| 2010-2012 | Assistant Professor Department of Materials Science, Institute of Graduate Studies and Research (IGSR), Alexandria University, Alexandria, Egypt. |
| 2009 | Post-doctoral Fellow Department of Fiber and Polymer Technology, School of Chemical Science and Engineering, Royal Institute of Technology (KTH), Stockholm, Sweden. |
| 2004-2007 | Graduate Research Fellow Department of Chemistry and Industrial Chemistry, Pisa University, Pisa, Italy |
| 1999-2003 | Demonstrator Department of Materials Science, Institute of Graduate Studies and Research (IGSR), Alexandria University, Alexandria, Egypt. |

TEACHING ACTIVITIES

I taught various graduate and postgraduate courses that deal with:

- General Chemistry: Principles and Modern Applications
- Quantitative Chemical Analysis
- Instrumental Methods of Chemical Analysis
- Polymeric Nanomaterials
- Nanomaterials and Its Applications
- Materials Properties
- Materials Structure
- Materials Selection
- Materials Characterization
- Polymeric Nanocomposites
- Polymer Science and Technology
- Absorbable and Biodegradable Polymers
- Degradation and Stabilization of Materials
- Recycling and Reuse of Materials
- New trends in Materials Science
- Biomaterials

Research Interests

- Processing of polymeric materials into nanoparticles and nanofibers for *Drug Delivery and Tissue Engineering* Applications
- Biomaterials for Potential Applications of Bone Regeneration.
- Thin Film Composite (TFC) Membranes for Seawater Desalination
- Hydrogels for Wastewater Treatments.
- Natural fibers (rice straw, sugarcane bagasse, ...etc.) reinforced biopolymers composites
- Sustainability and environmental aspects that cover recycling and polymer biodegradability.

SUPERVISED M.Sc. THESES (14)

1. Preparation and Characterization of Sol-Gel Derived Nanosize Bioactive Glass for Biomedical and Dental Applications. **(Finished)**
2. Synthesis and Characterization of Biodegradable Aliphatic Polyester for Drug Delivery Applications. **(Finished)**
3. Development of New Biodegradable Polymeric Nanofiber for Selected Biomedical Applications. **(Finished)**
4. Preparation and Characterization of Polymeric Nanoparticles for drug Delivery Applications. **(Finished)**
5. Loading of Anticancer Drugs on Polymeric Nanofibers. **(Finished)**
6. Preparation and Characterization of Polymer Hydrogel for Oral and Maxillofacial Tissue Engineering Applications. **(Finished)**
7. Study of the Effect of two different types of Bioactive Glass Material on bone Regeneration in Bony Defect of the Mandible. **(Finished)**
8. The Utilization of Natural Fiber Reinforced Recycled Plastic. **(Finished)**
9. New Polymeric Controlled Release Systems for Agricultural Applications. **(Finished)**
10. Formulation of New Materials for Desalination Membrane Based on Polymer Composite. **(Finished)**
11. Preparation and Characterization of Poly(vinyl alcohol)/Chitosan Hydrogels for Wastewater Treatment. **(Finished)**
12. Evaluation of the Thermal Stability of Some Prepared Polymers. **(Finished)**
13. Biodegradable Composite Hydrogel Scaffold for Potential Application of Bone Regeneration. **(Finished)**
14. Development of Collagen/Nanohydroxyapatite Antimicrobial hydrogels as Potential Scaffolds for Bone Regeneration. **(Still under supervision)**

SUPERVISED Ph.D. THESES (9)

1. Microwave Processing of Nanohydroxyapatite Bone Grafts. **(Finished)**
2. Rice Straw and other Agro Wastes as Reinforcing Material for Poly (hydroxyl butyrate). **(Finished)**
3. Biopolymer/Hydroxyapatite Composite Scaffolds With Pulsed Electromagnetic Field Therapy For Bone Regeneration. **(Still under supervision)**
4. High Performance Poly(ether ether ketone) Based Nanocomposites for the Use in Prosthodontics. **(Still under supervision)**

5. Poly(ether-ether-ketone) for prosthetic dental Implantology: Enhancement of the mechanical properties and bioactivity. *(Still under supervision)*
6. Development and Characterization of an Active Pharmaceutical Ingredient Using Polymeric Delivery Systems. *(Still under supervision)*
7. Evaluation of the Mechanical and Optical Properties of Nanocomposites Based on Poly (methyl methacrylate) Reinforced by Different Nanofillers for Dental Prosthetic Applications. *(Still under supervision)*
8. Evaluation of the Mechanical and Optical Properties of Nanocomposites Based on Poly (methyl methacrylate) Reinforced by Different Nanofillers for Dental Prosthetic Applications. *(Still under supervision)*
9. Fabrication and Evaluation of a Biodegradable Conductive Scaffolds for Dental Pulp Regeneration. *(Still under supervision)*

SCIENTIFIC PROJECTS

- PI in scientific project entitled "*Bioactive Composite Hydrogel for Vascular Potentials on a Chip*" funded from Science & Technology Development Fund (STDF), 2015-2017.
- Co-PI in scientific project entitled "*Optimization of Injectable Biomimetic Antimicrobial Scaffold for Jaw Bone Regeneration*" funded from Science & Technology Development Fund (STDF), 2015-2016.
- Member in scientific project entitled "*Nanocomposite Thin Film Membranes Based on Polymers and Clays for Reverse Osmosis Utilizations*" funded from Science & Technology Development Fund (STDF), 2013-2016.
- J.R in scientific project funded by the Swedish International Development Cooperation Agency (Sida) and administered by the Swedish Research Council entitled "*Synthesis and Processing of Biodegradable Polymers into Scaffolds and Nanoparticles for Biomedical Applications*". 2009.
- J.R in scientific project "*Mediterranean Diet: Typical Products Valorization (MeDiVal)*" between Istituto di Scienze dell'Alimentazione- CNR Via Roma 52 A/C- 83100 Avellino and Institute of Graduate Studies and Research (IGSR), University of Alexandria, Egypt. 2009.
- J.R in scientific project funded from The Sixth Framework Program of the European Community entitled "*New low-emissivity and long lasting paints for cost effective solar collectors*" (TERMISOL) 2006- 2009.
- J.R in scientific project funded by the Alexandria University entitled "*Development of Nanomaterials for Drug Delivery systems, Sensors, and photovoltaic Applications*". 2008-2009.
- J.R in scientific and technological co-operation between Italy and Egypt entitled "*Recycling of post-consumer packaging plastics: melt processing, property*

characterization and upgrading". Department of Materials Science, Institute of Graduate Studies and Research, Alexandria University, Egypt and National Research Council, Istituto per i Materiali Compositi e Biomedici (IMBC), Pisa, Italy.2003-2005.

MEMBERSHIP IN ACADEMIC SOCIETIES

- Arab Society of Materials Science
- American Chemical Society

MAIN HONORS AND AWARDS

- Travel reward for young researchers from the United Nations Industrial Development Organization (UNIDO), 2009.
- Award of Materials Science of Prof. Salah El-Din Morsi, Secretary-General, Supreme Council of Universities (SCU), 2008.

ATTENDED CONFERENCES

- The First Middle-Eastern Materials Science Conference, New York University Abu Dhabi, United Arab Emirates, March 22 to 24, (2016).
- Research and Education in the Middle East (Malta VII conference), Rabat, Morocco November 15-20, (2015).
- European Polymer Conference (EUPOC) 2011 "Biobased Polymers and Related Biomaterials". Organized by AIM, University of Pisa, Department of Chemistry & Industrial Chemistry, Pisa and Polish Academy of Sciences, Centre of Molecular & Macromolecular Studies, Lodz in Collaboration with University of Milan, Gargnano (Brescia), Italy, 29 May – 3 June, (2011).
- European Polymer Federation (EPF) 4th Summer School "Bioplastics and Related Materials". Organized by AIM, BPG and GFP in Collaboration with University of Milan, Gargnano (Brescia), Italy, 24-29 May (2009).
- Training Course on "Next Generation Biofuels: Development of sustainable chemical processes for production of biofuels and bio-based chemicals from agricultural waste and non-food biomass". Organized by The International Centre for Science and High Technology (ICS), which operates under the aegis of the United Nations Industrial Development Organization (UNIDO) in cooperation with the University of Bologna, Bologna, Italy, 14 - 18 September (2009).
- 1st Alexandria International Congress on "Tissue Engineering". Bibliotheca, Alexandria, Egypt, 14-16 February (2009).
- The 24th Month Progress Meeting of ExpertTissue Training Course on "Cell-Biomaterial Interfaces from Theory to Practice". Prague, Czech Republic, 17-20 October (2006).
- The 11th Course of the Biomaterials School, Ischia (Naples), Italy, 05-09 July (2004).

- The 7th Arab International Conference on Materials Science, “Recycling and Reuse of Materials”. Alexandria, Egypt, 17-20 March (2002).
- Cooperation Program of “Formation and assessment in Injection Technology” Organized by Spanish Confederation of Plastic Industries (ANAIP) and Arab Society of Materials Science (ASMS), Alexandria, Egypt, 29-31 January (2001).
- Euro- Mediterranean Master Class on “Technologies, Services, and Strategies for the Development of Sustainable and Competitive Food Packaging Sector”. Naples, Italy, June 04- July 04, (2001).
- Workshop of “Towards National Codes, Specifications, and Legislations for Plastic Recycling” Organized by Arab Society of Materials Science (ASMS), and Gothe Institute, Alexandria, Egypt, 17-18 October (2001).
- The 6th Arab International Conference on Materials Science, “Plastics Materials for Agriculture Applications”. Alexandria, Egypt, 19-22 November (2000).

PUBLICATIONS

1. “Development and biodistribution of a theranostic aluminum phthalocyanine nanophotosensitizer”. Heba Asem, **Ahmed Abd El-Fattah**, Noha Nafee, Ying Zhao, Labiba Khalil, Mamoun Muhammed, Moustapha Hassan , Sherif Kandil *Photodiagnosis and Photodynamic Therapy*, 13, 48–57, (2016).
2. “Sintering of Naturally Derived Hydroxyapatite using High Frequency Microwave Processing”. Mohamad Nageeb Hassan, Morsi Mohamed Mahmoud, Guido Link, **Ahmed Abd El-Fattah** and Sherif Kandil. *Journal of Alloys and Compounds*, 682, 107-114, (2016).
3. “Microwave-assisted preparation of nano-Hydroxyapatite for bone substitutes”. M.N. Hassan, M. Mahmoud, A. **Abd El-Fattah** and S. Kandil. *Ceramics International*.42, 3725-3744, (2016).
4. Preparation and Characterization of Injectable Poly(vinyl alcohol)/Bioactive Glass Hydrogel Composites for Periodontal Bone Regeneration. **Ahmed Abd El-Fattah**, Mohamad Nageeb Hassan, and Sherif Kandil. Presented at the conference on The First Middle-Eastern Materials Science Conference, New York University Abu Dhabi, United Arab Emirates, March 22 to 24, (2016).
5. “Microwave rapid conversion of sol-gel derived Hydroxyapatite into β -Tricalcium Phosphate”. M.N. Hassan, M. Mahmoud, **A. Abd El-Fattah** and S. Kandil. *Journal of Sol-Gel Science and Technology*, 76, 74-81, (2015).
6. “The Effect of Sugarcane Bagasse Fiber on the Properties of Recycled High Density Polyethylene (R-HDPE)”. **Ahmed Abd El-Fattah**, Abdel Ghafar EI Demerdash, Wagih Sadik, Alaa Bedir. *Journal of Composite Materials*, 49, 3251–3262, (2015).
7. “Antibiotic-free nanotherapeutics: Hypericin nanoparticles thereof for improved in vitro and in vivo antimicrobial photodynamic therapy and wound healing”. Noha Nafee, Alaa

- Youssef, Hanan El-Gowell, Heba Asem, **Ahmed Abd El-Fattah**, Sherif Kandil. *International Journal of Pharmaceutics*, 454, 249– 258, (2013).
8. “Biodegradable Polyesters as Biomaterials for Biomedical Applications”. **Ahmed Abd El-Fattah**, El-Refaie Kenawy, Sherif Kandil. *International Journal of Chemical and Applied Biological Sciences*, 1, 2– 11, (2014).
 9. "Nanocomposite Thin Film Membranes Based on Polymers and Clays for Reverse Osmosis Desalination". Doaa Mohamed, **Ahmed Abd El-Fattah**, Wagih Sadik, Sherif Kandil. Presented at the conference on “Frontiers of Science: Research and Education in the Middle East”. Malta, November 10-15, (2013).
 10. "Preparation of Injectable Polymeric Hydrogel for Oral and Maxillofacial Applications". M. Hassan, **A. Abd El-Fattah**, M. Marei, S.H. Kandil. Presented at the conference on “Biobased Polymers and Related Biomaterials”, (EUPOC-2011) Gargnano (Brescia), Italy, 29 May – 3 June, (2011).
 11. "Enzym- Catalyzed Polymerization of Copolymers Prepared from ϵ -Caprolactone and Pluronic". **A. Abd El-Fattah**, S.H. Kandil, and E. Chiellini. Presented at the conference on “Biobased Polymers and Related Biomaterials”, (EUPOC-2011) Gargnano (Brescia), Italy, 29 May – 3 June, (2011).
 12. "Synthesis and Characterization of Biodegradable Aliphatic Polyester for Drug Delivery Applications". **A. Abd El-Fattah**, H. Asem., L. El-Khordagui, S.H. Kandil. Presented at the conference on “Biobased Polymers and Related Biomaterials”, (EUPOC-2011) Gargnano (Brescia), Italy, 29 May – 3 June, (2011).
 13. “Biodegradable Polymeric Micro-Nanofibers by Electrospinning of Polyester/polyether Block Copolymers”. N. Detta, **A. Abd El-Fattah**, E. Chiellini, P. Walkenström, and P. Gatenholm, *Journal of Applied Polymer Science*, Volume 110, Issue 1, (2008).
 14. The Effect of Nano-scale Electric Field Generated from Magnetoelectric Nanoparticles on Histopathology of Liver cell Dysplasia in Mice. **A. Abd El-Fattah**, **Aya Osama** and S. Kandil. *Nanomedicine*, Article in Publication, (2017).
 15. Ahmed Abd El-Fattah, Olfat Sadek, Mohamed Khattab, and Sherif Kandil. "Reactive Compatibilization of Low Density Polyethylene and Poly(ethylene Terephthalate Blends”. *Proceedings of the International Conference on Chemistry and Industry, future trends for third millennium*, Riyadh, Saudi Arabia, December 11-14, (2004): 22-36.

PUBLISHED BOOKS

“Towards National Codes, Specifications and Legislations for Plastic Recycling”, **Co-Editor**, the Arab Society of Materials Science, Alexandria, Egypt, (2002).

h-index: 5

Citation: 248

INTERNATIONAL PEER REVIEW

Peer reviewer in the following highly ranked international journals:

1. Journal of Nanoparticle Research.
2. Materials Today.
3. Journal of Biomacromolecules.
4. Materials Science and Engineering.
5. Journal of Thermoplastic Composites

RESEARCH AND TEACHING INTERESTS

Statement of Teaching Interests

As you know, knowledge is far more valuable when shared. Thus teaching is especially important as it imparts knowledge to others. I can still clearly remember that I started enjoying teaching at a young age. After I had learned something new, I was always itching to share my new discovery with my companions. While growing up as a high school student, an undergraduate, a graduate, and even a post-doc, I have always admired those school teachers and university professors who excelled at conveying their knowledge to me.

My teaching experiences in Alexandria University have not only helped me to improve my teaching skills, but also have encouraged me to pursue a life-long career in teaching and research. Now that I am equipped with the knowledge of fundamental chemistry as well as research experience at the frontier of materials science, I am eager for a teaching opportunity to share what I have learned and to inspire those young and fresh minds so often found in academia

Teaching Philosophy

In my view, a great teacher is like a great artist who uses basic tools to transform raw materials into valuable assets of society. However, great artists may not have the best tools or best skills – they are recognized because of their passion and their unique perspective of the world. That is the difference between an artist and an artisan. Teaching is similar. Great teachers are not just ones who transmit information, teach skills, and

help students earn the best grades. They are those who share their passion for knowledge and curiosity with their students, inspire the students' creativity, develop their critical thinking ability, and prepare them for the complex world they will face after stepping off campus. Based on my own experiences of being a student and an administrator, I think the following principles are the most noteworthy ones in good teaching:

First, passion is one of the most key ingredients of effective teaching. It leads to thorough preparation, a continuous desire to improve teaching skills, and an intense delight in watching students learn. How well the students can learn greatly depends on how passionate and how devoted a teacher is.

Second, teaching is not just a way to impart knowledge, but can also be used as a method to foster interest in the subject. Students are naturally curious. They are intrigued by the world around them. Teaching is far more effective when students are truly intrigued, because they will actively learn and seek new knowledge rather than feeling like they are being forced to learn by the teacher.

Third, a teacher should encourage critical thinking and should always strive to be respectful of different opinions. Students, on the other hand, should learn to think independently, not merely accept the teacher's opinions. A teacher should be prepared to challenge and be challenged by the students as every student possesses unique perspectives, and they should be supportive when considering their different perspectives.

Now I would like to join their ranks and be a catalyst for others to fulfill their dreams. I believe my great passion for teaching, various past teaching experience, strong academic background and communication skills will make me an excellent teacher.

Research Interests

Materials science and chemistry is an interesting confluence of many disciplines. So, my research interests are very diverse. Some researches are very fundamental in nature, while others are more engineering oriented in which my groups main role is materials integration issues for advanced device applications. I enjoy correlating experimental observations to theoretical models. Making these correlations to me is the essence of

materials science and once these relationships are discovered, new materials can be designed and theoretical understanding can be refined.

My previous research work was focused on preparing nanoparticles and nanofibers block copolymers with different architectures and compositions. Polymeric materials with a range of different final properties were obtained by selecting suitable synthetic strategies. Moreover, those nano copolymers used as drug delivery systems and scaffolds for tissue engineering applications. They were loaded with various bioactive agents (antimicrobial, anticancer, and photosensitizer) and their release profile were studied.

My current research interests can be divided into three focus areas. Below is a summary of these three research focus areas.

1) Nanomaterials for Bone Regeneration

Bone defects remain a major problem in orthopaedic surgery where defects may arise from trauma, tumour resection, and osteomyelitis. The treatments of choice for these types of defects are bone grafting procedures. Currently, the most common type is biological grafts and they include autografts, allografts, and xenografts. However, each biological graft has its own limitations. Recently, synthetic bone graft substitutes are expected to play a vital role in bone regeneration.

The effort of my research team is to create various advanced injectable polymeric hydrogel/nano bioactive ceramic composites for bone regeneration and enhanced vascular angiogenic potential. I have a special interest in the development of injectable and antimicrobial scaffolds that exhibit toughness and plasticity from the polymeric phase and the compressive strength and mineralization properties typical of the bioactive ceramics.

I have two projects regarding this research field entitled “*Optimization of Injectable Biomimetic Antimicrobial Scaffold for Jaw Bone Regeneration*” and “*Bioactive Composite Hydrogel for Vascular Potentials in a Chip*” that are funded from Science and Technology Development Fund (STDF), Ministry of State for Scientific Research, Egypt.

2) Thin film Composite (TFC) Membranes for Seawater Desalination

Membrane separation technologies, mainly nanofiltration (NF) and reverse osmosis (RO), have secured an important role in available water purification processes as a promising single step technique for removing multiple sized solutes and organic pollutants from contaminated water. Currently, most of commercial desalination plants employ RO and NF with thin film composite (TFC) membranes at the heart of the separation processes. These membranes typically consist of at least two compositional layers, (i) a top thin selective layer and (ii) a bottom porous sublayer which are of different structures and materials. The porous support provides the required mechanical stability for the whole membrane structure to operate under high pressures while the ultrathin top layer plays the principal role in water filtration.

The interest of my lab is on the development of novel membranes, especially for desalination and on sustainability assessment of desalination processes such as water flux and salt rejection.

Currently, I am a member in scientific project entitled "*Nanocomposite Thin Film Membranes Based on Polymers and Clays for Reverse Osmosis Utilizations*" that are funded from Science and Technology Development Fund (STDF), Ministry of State for Scientific Research, Egypt.

3) Natural Fiber Reinforced Plastic Composites

There is a paramount worldwide need toward nontoxic and environmentally friendly materials that are having specific characteristics and are used for specific purposes due to the lack of resources and of the increase of environmental pollution. Agricultural residues are excellent alternative waste materials to substitute wood because they are plentiful, widespread, and available in abundance. In addition of their abundance and renewability, the utilization of agricultural residues has advantages concerning economy, environment, and technology. Thus, research on the development of composites being prepared using various recycled materials is being actively pursued.

The focus of my lab is to study bioconversion of agricultural fiber crops such as sugarcane bagasse into fibrous resources for composite manufacturing and dispersion of renewable biocellulose nanocomposite materials, their manufacturing processes, properties and some potential applications.

Research Philosophy

Materials chemistry is fascinating and exhilarating. I have an innate and almost insatiable desire to know “why?” and “how?” and to me there is nothing more fundamental than materials. The link between the atomic and even sub-atomic particles and their macroscopic properties whether they be mechanical, electrical, magnetic, thermal, or optical is critical to advancements in all engineering disciplines.

REFERENCE PERSONS

1) Prof. Sherif Kandil

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Alexandria University, Alexandria, Egypt.
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2) Prof. Moataz Soliman

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Research, Alexandria University, Alexandria, Egypt.
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