

NADER SHEHATA

- Assistant Prof., Engineering Mathematics and Physics Dept., Faculty of Engineering, Alexandria University, Egypt.
- Associate Director and co-founder of Center of Smart Nanotechnology and Photonics (CSNP), SmartCI Research Center of Excellence, Alexandria University.
- Former Adjunct Instructor, The Bradley Department of Electrical and Computer Engineering, Virginia Tech, United States.

Work address: SmartCI research center of excellence, Alexandria University, El-Horeya Rd., Elhadara, Alexandria, Egypt, 21544.

Tel: +2010-91165300.

E-mail: nader83@vt.edu/ nader.shehata@alexu.edu.eg

Website: <http://smartci.alexu.edu.eg/CSNP/>

Google Scholar page: http://scholar.google.com/citations?user=H_Cz_B8AAAAJ&hl=en&oi=sra.



EDUCATION

Ph.D., Electrical Engineering, *Virginia Tech*, United States, Nov.2012.

Thesis: Design of optical characteristics of ceria nanoparticles for applications including gas sensing and up-conversion.

M.Sc., Applied Physics, *Alexandria University*, Egypt, January 2010.

Thesis: Study of change in absorption coefficient and refractive index of nitride semiconductors due to carriers' injection.

B.Sc., Electrical Engineering, *Alexandria University*, Egypt, June 2005.

ACADEMIC EXPERIENCE

Research

* Post-doc Researcher and Instructor, *Virginia Tech*, Blacksburg, VA, from Dec. 2012 to July 2013 [Bio-Nanosensor lab, Bradley Department of Electrical and Computer Engineering (ECE)].

* Research Assistant, *Virginia Tech*, Blacksburg, VA, from Jan. 2011 to Dec. 2012 [Bradley Department of Electrical and Computer Engineering (ECE)].

* Research Assistant, *Virginia Tech*, Blacksburg, VA, from August 2012 to November 2012 [Institute for Critical Technology and Applied Science (ICTAS)].

Research Projects

* *Improvement of ceria nanoparticles' characteristics, January 2011 to present.*

- Effect of lanthanide and metal dopants in the optical and structural characteristics of ceria.
- Applying doped ceria nanoparticles in up-conversion, fluorescence quenching oxygen sensing and solar cells.

* *Nanofibers electrospinning, August 2012 to present.*

- Improvement of electrospun nanofibers with multi-layer and coaxial designs.
- Embedding nanoparticles, urea, and drugs within electrospun fibers.

- Drug delivery and free radical scavengers' applications.

Research Interests

- * Nanomaterials.
- * Optical processes: Absorbance, fluorescence, and up-conversion.
- * Related applications: Solar cells, gas sensors.
- * Semiconductor processing.
- * Nanofibers (Electrospinning).

Research skills

Lab:

- * Having strict experiences and deep knowledge within UV-VIS spectrophotometer, FT-IR spectroscopy, monochromators, transmission electron microscope (TEM), X-ray diffractometer (XRD), spin coating, mass flow controllers, needle electrospinning, needles electrospinning (Nanospider), filmatics, ellipsometer and Power meter.
- * Also, related to semiconductor fabrication tools, I have good experience in using the following tools: PVD, PECVD, mask alignment, etching, oxidation furnaces, thermal diffusion, and Dicing saw.
- * All of the previously mentioned facilities are associated with an excellent experience within the safety procedures of fume hoods and cleaning room.

Programming:

- * MATLAB, L-Edit, Comsol, Cadence, and ADS.

Teaching:

- * Assistant professor in Department of Engineering Mathematics and Physics, Faculty of Engineering, Alexandria University "from July 2013". The currently taught courses are:
 - EE203: Solid State Electronics.
 - MP107 and MP108: Elementary Physics.
- * Adjunct instructor in the Bradley Department of Electrical and Computer, Virginia Tech, from Dec. 2012 to July 2013. The taught courses are:
 - ECE 5240G: Advanced Semiconductor Processing Lab.
 - ECE 4244: Intermediate Semiconductor Processing Lab.
- * Teaching Assistant, Alexandria University, Egypt, from Sept.2005 to Dec.2010.
 - Teaching courses related to solid state devices, semiconductor devices, electronic circuits, electric circuits, elementary physics and modern physics.
 - Evaluating students' homework, laboratory performance and written reports.

FUNDED PROJECTS

- * PI in the accepted proposal titled as “Multi-purpose optical nano-sensor based on fluorescence quenching of cerium oxide nanoparticles”, accepted by STDF Egypt, Funded budget: 400K LE (56K \$), July 2014.
- * PI in the accepted proposal titled as “Fluorescent electrospun nanofibers with embedded nanoparticles”, accepted by ALEX REP-Alexandria University Egypt, Funded budget: 130K LE (18.5K \$), July 2014.
- * Lead-PI in the accepted proposal titled as “Innovative electrospun conductive spider silk nanofibers for human nerve regrowth”, accepted by QNRF, Funded budget: 758.8K \$, April 2015.
- * Co-PI in the accepted proposal titled as “Nano-enriched, trustworthy, and autonomous optical sensor for water pollution monitoring”, accepted by ITIDA Egypt, Funded budget: 960K LE (140K \$), December 2014.
- * Co-PI in the accepted proposal titled as “Biodegradable electrospun nanofibers as cancer stem cells host: A novel breast cancer therapy”, accepted by STDF Egypt, Funded budget: 100K LE (13K \$), February 2015.

AWARDS AND HONORS

- * Egyptian Government Graduate Fellowship, Virginia Tech, 2009-2013.
- * US patents: Dissolved oxygen sensing using fluorescence quenching of ceria nanoparticles “U.S. Patent Application No: 61/670,822, supported by Virginia Tech”.

PUBLICATIONS

Book Chapters:

- * **Nader Shehata** and Kathleen Meehan, Potential Applications of Samarium As a Dopant Element (pp. 111-136), in “Samarium: Chemical Properties, Occurrence and Potential Applications”, Kaitlyn R. Danford, 2014, Nova Publisher, New York.
- * Ibrahim Hassounah and **Nader Shehata**, Designing and testing single tablet for tuberculosis treatment through electrospinning, in “Applications of NanoBioMaterials (Volume I-XI)”, in press.

Journal papers:

- * **N. Shehata**, K. Meehan, I. Hassounah, M. Hudait, N. Jain, M. Clavel, S. Elhelw, and N. Madi, Reduced erbium-doped ceria nanoparticles: one nano-host applicable for simultaneous optical down- and up-conversions, *Nanoscale Res Lett.* 2014; 9(1): 231.
- * **N. Shehata**, K. Meehan, M. Hudait and N. Jain, Control of oxygen vacancies and Ce⁺³ concentrations in doped ceria nanoparticles via the selection of lanthanide, *Journal of Nanoparticle Research*, vol. 14, pp. 1173-1183 (2012). DOI 10.1007/s11051-012-1173-1.
- * **N. Shehata**, K. Meehan, D. Leber, Fluorescence quenching in ceria nanoparticles: A dissolved oxygen molecular probe with a relatively temperature insensitive Stern-Volmer constant up to 50°C, *Journal of Nanophotonics*, vol. 6, pp. 063529/1-11 (2012). DOI: 10.1117/1.JNP.6.063529.

- * **N. Shehata**, K. Meehan and D. Leber, Study of fluorescence quenching in aluminum-doped ceria nanoparticles: Potential molecular probe for dissolved oxygen, *Journal of Fluorescence*, vol. 23, pp. 527–532 (2013). DOI: 10.1007/s10895-013-1186-x.
- * **N. Shehata**, K. Meehan, I. Ashry, I. Kandas, and Y. Xu, Lanthanide-doped ceria nanoparticles as fluorescence-quenching molecular probes for dissolved oxygen, *Sensors and Actuators B*, vol. 183, pp. 179-186 (2013).
- * I. Hassounah, **N. Shehata**, A. Hudson, B. Orler and K. Meehan, Characteristics and 3-D formation of PVA and PEO electrospun nanofibers with embedded urea, *Journal of Applied Polymer Sciences*, Vol. 131 (3), pp. 39840 (2014).
- * Hassounah IA, **Shehata NA**, Kimsawatde GC, Hudson AG, Sriranganathan N, Joseph EG, Mahajan RL. 2014. Studying the activity of antitubercluosis drugs inside electrospun polyvinyl alcohol, polyethylene oxide, and polycaprolacton nanofibers. *J Biomed Mater Res Part A*, Vol. 102 (11), pp. 4009–4016 (2014).
- ***N. Shehata**, K. Meehan, M. Hudait, N. Jain, S. Gaballah, Study of Optical and Structural Characteristics of Ceria Nanoparticles Doped with Negative and Positive Association Lanthanide Elements, *Journal of Nanomaterials*, Volume 2014 (2014), Article ID 40149.

Conference papers:

- * **N. Shehata**, K. Meehan, D. Leber, Dissolved oxygen sensing using fluorescence quenching of ceria nanoparticles, SPIE Nanoengineering and photonics conference, Nanoengineering: Fabrication, Properties, Optics, and Devices IX, vol. 4863, pp. 84630/1-9, San Diego, California, US (August 2012). DOI 10.1117/12.956281
- * **N. Shehata**, K. Meehan, I. Hassounah, J. Camelio, Electrospinning of decorated nanofibers with active cerium oxide nanoparticles, Nanotech conference, National Harbor, Maryland, US (May 2013).
- * **N. Shehata**, K. Meehan, I. Hassounah, Annealing impact on optical conversions in ceria-doped-erbium nanoparticles, EMC 55th conference, South bend, Indiana, US (June 2013).
- ***N. Shehata**, I. Kandas, K. Meehan, Optical characteristics of aluminum-doped ceria nanoparticles, Nanotech Dubai (March 2015).
- ***N. Shehata**, A. Mansour, B. Hamza, M. Rizk, Efficient Design of Flexible and Low-cost Dual Band RFID inkjet printed antenna using silver nanoparticles ink, Setcor Nanotech France (June 2015).
- * I. Kandas, **N. Shehata**, E. Samir, M. Hagra, H. Khater, Parametric study on Fiber Bragg Grating for sensitivity improvement , Setcor Nanotech France (June 2015).
- *I. Kandas, **N. Shehata**, C. Daengngam, Y. Xu, Detection of coating fluorophores' density in improved Q-factor cavities, SPIE, San Diego, CA (August 2015).

REVIEWING ACTIVITY:

Research Fund agencies "Research proposals evaluator":

- Ministry of Higher Education, Egyptian Government. - ERAfrica Call for Interfacing Challenges.

Journals:

- Physical Chemistry Chemical Physics, RSC. - Journal of Nanoparticle Research, Springer.
- Journal of Electrical Engineering, David Publishing Company. -OncoTargets and Therapy, Dove press.
- International Journal of Physical Sciences, Academic Journals.

Others:

- Virginia Tech Research Symposium.