

## DR. ADEEL AFZAL

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Date of Birth: June 23, 1980

Nationality: Pakistani (Passport No. A9277491)

### EDUCATION

University of Vienna, Vienna, Austria

DOCTOR OF THE NATURAL SCIENCES (CHEMISTRY/CHEMICAL SENSORS) Nov. 2007

Dissertation: "Development of synthetic antibodies for chemical sensor coatings"

Honors: Passed with Distinction

Quaid-i-Azam University, Islamabad, Pakistan

MASTER OF PHILOSOPHY (ORGANIC POLYMER CHEMISTRY) Aug. 2004

Thesis: "Synthesis and characterization of epoxy-based interpenetrating O-I hybrid materials using GPTMS as the coupling agent"

Quaid-i-Azam University, Islamabad, Pakistan

MASTER OF SCIENCE (ORGANIC CHEMISTRY) Jun. 2002

Thesis: "Synthesis and characterization of dihalophenyl isocoumarins and their 3,4-(dl)-dihydro analogue"

Honors: 1<sup>st</sup> Position in semester I, III, and IV.

The University of Punjab, Lahore, Pakistan

BACHELOR OF SCIENCE (BIO CHEMISTRY) Aug. 2000

Major: Chemistry, Botany, Zoology

### AWARDS

Doctoral Scholarship, Higher Education Commission of Pakistan Mar. 2005 – Feb. 2008

Merit Scholarship, Quaid-i-Azam University, Islamabad, Pakistan Jan. 2000 – Jun. 2002

Merit Scholarship, Government of Punjab, Pakistan Aug. 2002 – Aug. 2004

### CURRENT EMPLOYMENT

Quaid-i-Azam University, Islamabad, Pakistan

ASSISTANT PROFESSOR (ORGANIC POLYMER CHEMISTRY) Sep. 2008 – Present

"Temporary Appointment"

Developed syllabus and overall course structure, delivered lectures to M.Sc, M.Phil and Ph.D students, organized practical exercises, and administered all grades.

Courses: Organic Polymer Chemistry | Organic Chemistry – I | Chemistry of Natural Products | Reaction Mechanism

Practicum: Organic Chemistry Laboratory – I | Organic Chemistry Laboratory – II

### WORK HISTORY

University of Vienna, Vienna, Austria

RESEARCH ASSISTANT Mar. 2005 – Dec. 2007

Developed selective coatings for QCM-based mass sensitive devices, performed on-line monitoring of engine oil degradation processes and detection of pollutants e.g. metal ions and polycyclic aromatic hydrocarbons in water.

DR. ADEEL AFZAL

National Engineering and Scientific Commission, Islamabad, Pakistan  
ASSISTANT MANAGER (CHEMISTRY) Sep. 2003 – Feb. 2005  
Developed composite-based high energy materials and analyzed their properties e.g. IR emission, heat capacity etc; administered synthetic chemistry lab and managed records.

Quaid-i-Azam University, Islamabad, Pakistan  
RESEARCH ASSISTANT Jun. 2003 – Aug. 2004  
Prepared a series of epoxy based nanocomposite materials with silanes as the reinforcement and organo-functional silane coupling agent; characterized and reported their thermal and mechanical properties.

#### RESEARCH INTERESTS

##### *Chemoselective materials and devices*

Design, synthesis, and fabrication of chemoselective coatings for mass sensors based on acoustic wave transducers. Development of artificial polymers, self-assembled nanoparticles, imprinted ceramics, and nanostructured and functional monolayers with molecular recognition abilities to detect various chemicals (analytes) in gaseous and solution states.

##### *High performance coatings*

Synthesis and characterization of novel hybrid and/or nanocomposite materials based on organic thermosetting polymers and inorganic metal oxide fillers as high performance coatings for aerospace applications.

#### CURRENT PROJECTS

“*Synthesis and in-situ functionalization of metal oxide nanoparticles*”  
University Research Fund, Quaid-i-Azam University, Islamabad, Pakistan PKR 70,000/-  
“*Super-toughened elastomeric coatings: role of metal oxide nanoparticles in property enhancement*”  
Higher Education Commission of Pakistan PKR 5.0 Million

#### MEMBERSHIPS

The Chemical Society of Pakistan  
The Society for Molecular Imprinting

#### SKILLS

##### ANALYTICAL

Ample expertise in working with the following basic and advanced analytical instruments;  
Spectrophotometers: ATR- & FT- IR, UV-visible, and Fluorescence.  
Microscopes: AFM, STM, SEM, and Fluorescence.  
Others: GCMS, TGA, DSC, Bomb Calorimeter, and Network Analyzer.

##### COMPUTATIONAL

Computer proficient in Microsoft Windows, Microsoft Office, Chem Office, Corel Office, Corel Designer, Micrografx Designer, Chem Draw, Adobe, Web Browsers, and some Lab View and Mat Lab

##### COMMUNICATION

Urdu – native language  
English – can speak fluently and read/write with high proficiency  
German – can speak, read, and write with basic competence; passed Deutsch Language Courses (level A1 and A2) from University of Vienna, Austria

PUBLICATIONS

ARTICLES

[1] *Anal. Bioanal. Chem.* 2008: 392, 1405-1410

“Polymers imprinted with PAH mixtures – comparing fluorescence and QCM sensors”

Peter A. Lieberzeit, Konstantin Halikias, Adeel Afzal, Franz L. Dickert

[2] *Sens. Actuators*, 2007: 127, 132-136

“Nanoparticles for detecting pollutants and degradation processes with mass-sensitive sensors”

P.A. Lieberzeit, A. Afzal, A. Rehman, F.L. Dickert

[3] *Anal. Bioanal. Chem.* 2007: 389, 441-446

“Molecularly imprinted sol-gel nanoparticles for mass-sensitive engine oil degradation sensing”

Peter A. Lieberzeit, Adeel Afzal, Gerd Glanzing, Franz L. Dickert

[4] *Sens. Actuators*, 2007: 126, 153-158

“Printing materials in micro- and nano-scale systems for process control”

Peter A. Lieberzeit, Adeel Afzal, Dagmar Podlipna, Stefan Krassnig, Hans Blumenstock, Franz L. Dickert

BOOK CHAPTERS

[5] *Transworld Research Network*, 2009: 37/661 (2), Fort P.O. Trivandrum, Kerala, India (ISBN: 978-81-7895-412-7)

*Nanotechnological Applications of Novel Polymers*, Mohsen Adeli (Ed.)

“Imprinting – a nanotechnology for chemical sensors”

Adeel Afzal, Franz L. Dickert

[6] *IOS Press*, 2008: 39/60-76 (ISBN: 978-15-8603-858-8)

*Commercial and Pre-commercial Cell Detection Technologies for Defense against Bioterror – Technology, Market and Society*, L.M. Lechuga, F.P. Milanovich, P. Skládal, O. Ignatov (Eds.)

“Detection of cells and viruses with mass-sensitive devices – applications of synthetic antibodies”

Adeel Afzal, Franz L. Dickert

PROCEEDINGS

[7] *MRS Symp. Proc.* 2008: Vol. 1094E, Warrendale, USA, (1094-DD05-08)

“Bioanalogous recognition with sol-gel thin films and nanoparticles in harsh environments”

Peter A. Lieberzeit, Adeel Afzal, Adnan Mujahid, Franz L. Dickert

PRESENTATIONS|POSTERS

[8] *European Polymer Congress'09*, 12-17 July 2009, Graz, Austria

“Effect of temperature and interphase bonding on the properties of epoxy-silica nanocomposites”

Tanzeela Nazir, Adeel Afzal, Humaira M. Siddiqi, Michel Dumon

[9] *Anakon*, 27-30 March 2007, Jena, Germany

“Nanostrukturierte Sensormaterialien für die Überwachung oxidativer Abbauprozesse in Motorenölen”

P.A. Lieberzeit, G. Glanzing, A. Afzal, F.L. Dickert

[10] *International Congress on Analytical Sciences (ICAS'06)*, 25-30 June 2006, Moscow, Russia

“Nanostrategies to monitor oil degradation”

P.A. Lieberzeit, G. Glanzing, A. Afzal, F.L. Dickert

[11] *Frontiers in Polymer Science*, 7-9 June 2009, Mainz, Germany

“Thermo-mechanical property benefits of chemically bonded interpenetrating epoxy-silica hybrid materials”

Adeel Afzal, Tanzeela Nazir, Humaira M. Siddiqi

[12] *20<sup>th</sup> Eurosensors Conference*, 17-20 September 2006, Goeteborg, Sweden

“Nanoparticles for detecting pollutants and degradation processes with mass-sensitive sensors”

P.A. Lieberzeit, A. Afzal, A. Rehman, F.L. Dickert

PUBLICATIONS (IN PROGRESS)

ARTICLES

[1] *Anal. Chim. Acta*, 2009, submitted

“Imprinted sol-gel materials for monitoring degradation products in automotive oils by STW”

Adnan Mujahid, Adeel Afzal, Gerd Glanzing, Anton Leidl, Peter A. Lieberzeit, Franz L. Dickert

[2] *Prog. Org. Coatings*, 2009, submitted

“Thermally and mechanically superior hybrid epoxy-silica coatings via sol-gel method”

Tanzeela Nazir, Adeel Afzal, Humaira M. Siddiqi, Zahoor Ahmed, Michel Dumon

[3] *Macromol. Symp.* 2009, submitted

“Effect of temperature and interphase bonding on the properties of epoxy-silica nanocomposites”

Adeel Afzal, Tanzeela Nazir, Humaira M. Siddiqi, Zahoor Ahmed, Michel Dumon

[4] *Polym. Degrad. Stability*, 2009, under preparation

“Polymers from DGEBA and aromatic mono- and di-amines: synthesis, characterization and thermal degradation”

Samia Sajid, Adeel Afzal, Humaira M. Siddiqi, Zareen Akhter

[5] *J. Appl. Polym. Sci.* 2009, under preparation

“Thermal and mechanical characteristics of coupled epoxy-silica hybrid materials”

Adeel Afzal, Humaira M. Siddiqi, Shaukat Saeed, Zahoor Ahmed

BOOK CHAPTERS

[6] *Momentum Press*, 2009, submitted

“Surface acoustic wave (SAW) sensors for chemical applications – a review”

Adeel Afzal, Franz L. Dickert

BOOKS

[7] *Springer Publishers*, 2010, under preparation

Chemical Sensors, Franz L. Dickert (Ed.)

“Chapter III: Transducer Principles and Chapter IV: Chemoselective Materials”

Adeel Afzal, Peter A. Lieberzeit, Franz L. Dickert

REFERENCES

[1]. O. Univ.- Prof. Dr. Franz Ludwig Dickert

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[2]. Ao. Univ.- Prof. Dr. Peter Alexander Lieberzeit

University of Vienna, Waehringerstrasse 38, 1090 Vienna, Austria | +43 1 4277 52341 | [Peter.Lieberzeit@univie.ac.at](mailto:Peter.Lieberzeit@univie.ac.at)

[3]. Dr. Humaira Masood Siddiqi (Associate Professor)

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