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Senior Associate Academic Dean
Whitacre College of Engineering
Texas Tech University
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EDUCATION:

Ph.D., Chemical Engineering Department, Middle East Technical University (METU), Ankara, Turkey.

M.S., Chemical Engineering Department, METU, Ankara, Turkey

B.S., Chemical Engineering Department, METU, Ankara, Turkey.

PROFESSIONAL EXPERIENCE:

Senior Assoc. Academic Dean Texas Tech University Whitacre College of Engineering Lubbock, TX	Sept 2016 – current
Interim Chair- Mechanical Engineering Department Texas Tech University Whitacre College of Engineering	Sept 2019 - Dec 2021
Rector-President Yeditepe University, Istanbul, Turkey:	Sept. 2010 – March 2016
Professor – Yeditepe University Chemical Engineering Dept.	Sept. 2007 – Sept. 2016
Department Head, Yeditepe University Chemical Engineering Department, Istanbul, Turkey:	Feb 2008 – Sept.2010
Department Head, METU Chemical Engineering Department, Ankara, Turkey:	Dec. 2004 - Sept.2007
(ABET Accredited) Professor, METU Chemical Engineering Department,	March 2004 – Sept.2007

Associate Director, Center of Advanced Microgravity Materials Processing (CAMMP) - a NASA Commercial Space Center, Northeastern Univ., Boston, MA, USA (Director Al Sacco, Jr.) July 1997 – Dec 2003

Responsibilities: Managing flight activities related to CAMMP experiments on **the Space Shuttle and International Space Station (ISS)**, supervising postdoctoral scientists, engineering staff, and graduate students dealing with research experiments and documents to be submitted to **NASA**. Providing training sessions at JSC, Houston, TX to NASA astronauts and Russian Space Agency Cosmonauts in regards to hardware and operational procedures for CAMMP experiments on ISS. Coordinating with subcontractors to oversee the design and manufacture of hardware for CAMMP experiments in space, organizing of extensive testing to qualify these hardware for space flight, and coordinating with the **NASA** centers (Kennedy Space Center, Cocoa, FL; Johnson Space Center, Houston, TX, and Marshall Space Flight Center, Huntsville, AL) for activities related to flying experiments in space.

Assoc. Professor, Chemical Engineering Department, Northeastern University, Boston, MA, USA July 1997 – March 2004

Professor, (1990-99) Associate Professor, (1984-90) Assist. Professor (1982-84), Instructor (1979- 80), Chemical Engineering Dept., METU (Middle East Tech. Univ.), Ankara, Turkey. Sept. 1979 - Sept. 1999.

Visiting Professor, Chemical Engineering Department, WPI, Worcester, MA. (Dec. 1994-April 1997), (May 1992-Sept. 1992), & (Aug. 1989-Oct. 1991).

Responsibilities: Preparation of courses, teaching, and administration, in addition to managing Space Flight activities program for two experiments flown on the NASA's Columbia Space Shuttle during the United States Microgravity Laboratory (USML-1 and USML-2) missions in 1992-95. Organizing the preflight lab activities at Kennedy Space Center, Florida, USA

Assoc. Department Head, Chemical Engineering Department, METU, Ankara Turkey. (Sept. 1984 - May 1989 & Sept. 1992 - July 1994).

Responsibilities: Assisting the Chairman in directing and managing all aspects of the department with 22 faculty, 450 undergraduate, and 80 graduate students.

Research Associate, Chemical Engineering Department, WPI, Worcester, MA, USA (Sept. 1980 - May 1982).

Responsibilities: Directing and performing original work in the area of residual protection of gas mask filters for chemical warfare. Research funded by US ARRADCOM (US Army Research and Development Command, Edgewood Arsenal, MD)

CONSULTING:

**Şişe Cam Chemicals Sodium Bicarbonate Plant , Mersin Turkey
Nov 2005 - Dec. 2006**

NSF (Washington, DC USA) Engineering Directorate Review Panel: June 2003

United Nations Industrial Development Org. (UNIDO), Jan. 1994 - July. 1995.
Vienna, Austria. – Expert in Energy Optimization in Refineries and Petrochemicals

Mechanical and Chemical Industries Corporation (MKEK),
Ankara, Turkey. Nov.1992 - Nov. 1994.

Set Cement Plant, Ankara, Turkey. Nov. 1992 - April 1994.

Petrochemical Industries (PETKIM), Yarimca, Turkey. Oct. 1985 - Dec. 1987.

RESEARCH GRANTS

UNIDO Vienna “ Development of a 3 kW Hydrogen Fuel Cell Prototype ” (joint project with Prof. Eroglu at METU and Teksis Inc.) 2010-2012

TÜBİTAK MAG, Turkey “ Development of PEM Fuel Cells for High Temperature Operation”
Project No: 104M364 , Project Director, July 2005- June 2008.

National Science Foundation , USA - Major Research Instrumentation Grant "Acquisition of Scanning Electron Microscope (FESEM) for Nanoscience and Biotechnology"
accepted July 2003 (with D. Heiman, S.Mukerjee, K.Lewis, S.Sridhar)

NU -Research Scholarship Development Fund : "Novel Polymer-Zeolite Mixed Matrix Membranes for Gas Separation" Boston, MA April 2001.

Center for Advanced Microgravity Materials Processing (CAMMP) Boston, MA
:Cooperative agreement with **NASA** , - accepted **1997**;
(Director : Al Sacco Jr. , Assoc. Director :Nurcan.Bac)

HONORS :

METU Prof. Dr. Mustafa Parlar Foundation “ Best Educator at METU” 2004 – 2005

NASA - STS (Space Transportation System) - Flight 107 2004
- Letter and Memento of Appreciation

NASA – STS- Flight 73 Memento of Appreciation 1995

NASA – STS- Flight 50 Memento of Appreciation 1992

JOURNAL PUBLICATIONS:

E.Sumer, M. Hamitoglu, A. Cumbul, S. Ercan, N. Bac, A. Aydin “Determination of In Vivo efficacy and safety of zeolite as a new pleurodesis agent” *Toxicology Reports* 9 (2022) 1754-1765 <https://doi.org/10.1016/j.toxrep.2022.09.003>

E.S. Bailey, M. Curcic, J. Biros, H. Erdogmus, N. Bac, A. Sacco Jr. “ Essential Oil Disinfectant Efficacy Against SARS-CoV-2 Microbial Surrogates” *Front. Public Health, Sec. Environmental health and Exposome* 9 December (2021) <https://doi.org/10.3389/fpubh.2021.783832>

Rumeysa Tekin, Nurcan Bac, “Antimicrobial Behaviour of ion-exchanged zeolite X containing fragrance “ *Microporous and Mesoporous Materials* 234 (2016) 55-60

Rumeysa Tekin, Nurcan Bac , Juliusz Warzywoda , Albert Sacco Jr. “Encapsulation of a fragrance molecule in zeolite X” *Microporous and Mesoporous Materials* 215 (2015) 51-57

Rumeysa Tekin, Nurcan Bac, Juliusz Warzywoda, Albert Sacco Jr., “Effect of reaction mixture composition on size distribution of zeolite X crystals” *Journal of Crystal Growth* 411 (2015) 45-48

Zeynep İyigündoğdu, Selami Demirci,Nurcan Bac,Fikrettin Şahin, “Development of durable antimicrobial surfaces containing silver and zinc-ion exchanged zeolites” Turkish Journal of Biology (2014) Volume:38 Issue:3 Pages: 420-427

Selami Demirci, Zeynep Ustaoglu, Gonca Altın Yilmazer, Fikrettin Sahin, Nurcan Bac “Antimicrobial Properties of Zeolite-X and Zeolite-A Ion-Exchanged with Silver, Copper, and Zinc Against Broad Range of Microorganisms” Applied Biochemistry and Biotechnology (2014) Volume: 172 Issue: 3 Pages: 1652-1662

R. Tekin , N. Bac, ,H. Erdogmus. “Microencapsulation of Fragrance and Natural Volatile Oils For Application in Cosmetics, and household cleaning products.” *Macromolecular Symp.* (2013) Volume: 333 Issue: 1 Pages: 35-40, Polymer Science

Devrim Y., Erkan S., Bac N., Eroglu İ. “Nafion/titanium silicon oxide nanocompositemembranes for PEM fuel cells” *International Journal Energy Research* (2012) (wileyonlinelibrary.com) Volume: 37 Issue: 5 Pages: 435-442

Devrim Y., Erkan S., Bac N.,Eroglu İ., “Improvement of PEMFC performance with Nafion/inorganic nanocomposite membrane electrode assembly prepared by ultrasonic coating technique.” International Journal of Hydrogen Energy (2012) Volume 37, Issue 21, November 2012, Pages 16748–16758

Dilek Ergun, Yilser Devrim., Nurcan Bac, Inci Eroglu. "Phosphoric Acid Doped Polybenzimidazole Membrane for High Temperature PEM Fuel Cell" *Journal of Applied Polymer Science* DOI 10.1002/app (2012)

Devrim Y., Erkan S., Bac N., Eroğlu İ. "Preparation and characterization of sulfonated polysulfone/titanium dioxide composite membranes for proton exchange membrane fuel cells" *International Journal of Hydrogen Energy* 34 (2009) 3467-3475.

Şengül E., Erdener H., Akay R. G., Yücel H., Bac N., Eroğlu , Effects of Sulfonated Polyether-etherketone (SPEEK) and Composite Membranes on the Proton Exchange Membrane Fuel Cell (PEMFC) Performance *International Journal of Hydrogen Energy*, 34, (2009) 4645-4652.

Şengül E., Erkan S., Eroğlu İ., Bac N., Effect of Gas Diffusion Layer Characteristics and "Addition of Pore Forming Agents on the Performance of Polymer Electrolyte Membrane Fuel Cells" *Chemical Engineering Communications*, 196 (2009) 161-170

Kamişoğlu K. E. Ayşe Aksoy, B. Akata, N. Hasırcı. N. Bac, "Preparation and Characterization of Zeolite Beta- Polyurethane Composite Membranes", *Journal of Applied Polymer Science*, 110 (2008) 2854-2861.

E. Ayşe Aksoy, B. Akata, N. Bac, N. Hasırcı. "Preparation and Characterization of Zeolite Beta- Polyurethane Composite Membranes", *Journal of Applied Polymer Science*, 104 3378-3387 (2007).

Warzywoda, J., N. Bac, G. A. Rossetti, Jr., N. V. d. Puil, J. C. Jansen, H. van Bekkum and A. Sacco, Jr., "Synthesis of High-Silica ZSM-5 in Microgravity," *Microporous and Mesoporous Materials*, 38, 423-432 (2000).

Warzywoda, J., N. Bac, J. C. Jansen and A. Sacco, Jr., "Growth of Zeolites A and X in Low Earth Orbit," *Journal of Crystal Growth*, 220, 140-149 (2000).

Warzywoda, J., M. Valcheva-Traykova, G. A. Rossetti, Jr., N. Bac, R. Joesten, S. L. Suib and A. Sacco, Jr., "Characterization of Zeolites A and X Grown in Microgravity," *Journal of Crystal Growth*, 220, 150-160 (2000).

I. Guray, J. Warzywoda, N. Bac, and A. Sacco Jr., "Synthesis of Zeolite MCM-22 Under Rotating and Static Conditions", *Microporous and Mesoporous Materials*, 31, 241-251 (1999).

Warzywoda, J., N. Bac, and A. Sacco Jr., "Synthesis of Large Zeolite X Crystals" *Journal of Crystal Growth*, 204, 539 -541 (1999).

Bac, Nurcan, Warzywoda, J., and Sacco, Jr., A., "Zeolite Crystal Growth in Microgravity-The USML-2 Mission" Second United States Microgravity Laboratory: **One Year Report** (eds. M. Vlasse, D. McCauley, C.Walker), NASA George C. Marshall Space Flight Center, Huntsville AL Vol. 1 NASA/TM-1998-208697 (1998).

PATENTS:

PROCESS FOR PREPARATION OF MEDICAL GRADE POLYURETHANE COMPOSITES CONTAINING ANTIBACTERIAL ZEOLITE

European Patent Application EP2342248 - 2008

Hasirci, Nesrin , Bac, Nurcan, Kamisoglu, Kubra, Akata Kurc, Burcu, Aksoy, Eda Ayse

POLYURETHANE COMPOSITES CONTAINING ANTIBACTERIAL ZEOLİTE

Turkish Patent TR 2011 02812 B

Hasirci, Nesrin, Bac, Nurcan, Kamisoglu, Kubra , Akata Kurc, Burcu, Aksoy, Eda Ayse

ANTIMICROBIAL MATERIAL - Turkish Patent - TR2011 13331 B

Şahin, Fikrettin , Baç, Nurcan, Ustaoglu, Zeynep , Demirci, Selami

ANTIMICROBIAL MATERIAL COMPRISING A METAL ION CHARGED ON SYNTHESIZED ZEOLITE (2015) United States Patent Application 20150030532

Sahin, Fikrettin (Istanbul, TR) , Bac, Nurcan (Istanbul, TR) , Demirci, Selami (Istanbul, TR) , Ustaoglu, Zeynep (Istanbul, TR)

BOOKS:

Rumeysa Tekin, Huseyin Erdogmus, Nurcan Bac, " Assessment of Zeolites as Antimicrobial Fragrance Carriers , (Book Chapter - 2017) Microbiology Book Series #6 Antimicrobial Research, Ed. A. Mened-Vilas, Formatex Research Center, Spain ISBN-13:978-84-947512-0-2

Nurcan Bac, H.Erdener, S. Erkan, E, Eroglu, N.Gur, E. Sengul, "Sustainable Energy and Hydrogen" (in Turkish) ODTU Yayincilik , (2007).

Nurettin Bac, Münevver Bac, Nurcan Bac, Tarık Kardesoglu " Chemistry for High Schools - 1 " (in Turkish) Fil Yayınevi , İstanbul (1997).

Nurettin Bac, Münevver Bac, Nurcan Bac, " Chemistry for High Schools - 2 " (in Turkish) Fil Yayınevi , İstanbul (1997).

Nurettin Bac, Münevver Bac, Nurcan Bac, " Chemistry for High Schools - 3 " (in Turkish) Fil Yayınevi , İstanbul (1997).

CONFERENCE PROCEEDINGS:

Nurcan Bac– Invited Speaker – “Synthesis of Advanced Materials in the Space Shuttle and International Space Station with Spin-off Applications on Earth” **United Nations Committee on Peaceful Uses of Outer Space**, COPUOUS Vienna, Austria June 10 -13, 2009

D. Ergun, S. Erkan, Y. Devrim, N. Bac, I. Eroglu, High Temperature Proton Exchange Membrane Fuel Cells, **Hyphothesis VIII** Lisbon, Portugal, 1-3 April 2009.

Zeynep Ustaoglu , Nurcan Bac “ Synthesis and of Nanoporous Zeolites with Antimicrobial Activity” **NANOTR5** , 5. Nanoscience and Nanotechnology Conference Anadolu University , Eskişehir, Turkey June, 8-10 2009

Yurdakul, Ahmet O., Nurcan Bac, İnci Eroglu, “Acid Doped Polybenzimidazole Membranes for High Temperature PEM Fuel Cells” **Proceedings International Hydrogen Energy Conference 2007** – Istanbul 13-15 July (2007).

Sengül, Erce, Serdar Erkan, İnci Eroğlu, Nurcan Bac, “ Effect of Membrane Electrode Assembly (MEA) Preparation Technique on the Performance of Polymer Electrolyte Membrane Fuel Cell (PEMFC)” **Proceedings International Hydrogen Energy Conference 2007** – Istanbul 13-15 July (2007).

Akay, R.Gultekin, Hülya Erdener, Nurcan Bac, İnci Eroğlu, “Aromatic Polymer Blend Membranes for PEM Fuel Cell Applications” **Proceedings International Hydrogen Energy Conference 2007** – Istanbul 13-15 July (2007).

Gur N., Akay G., Akata B., Bac, N. “Synthesis of Zeolite Beta for Composite Membranes” **International Symp. On Zeolites and Microporous Crystals (ZMPC2006)** Yanago, Tottori, Japan 25-29 July (2006)

Bac. N., Akay, G., Mukerjee S., “Composite Membranes Based on Post-sulfonated Non-fluorinated Aromatic Polymers” **AICHE (American Institute of Chemical Engineers) Annual Meeting**, San Francisco, USA November 12-17 (2006)

Bac, Nurcan, S. Nadirler. C. Ma, S. Mukerjee, “Inorganic-Organic Composite Membranes for Fuel Cells” **Proceedings International Hydrogen Energy Congress and Exhibition IHEC 2005** Istanbul, Turkey, 13-15 July 2005

Bac, Nurcan, J. Harpster, R.A. Maston, and A. Sacco Jr., “Zeolite Crystal Growth Facility for Solution Crystal Growth on The International Space Station”, **American Institute of Aeronautics and Astronautics - Annual Symposium on International Space Station Utilization**, Paper 2001-4949, Cocoa Beach FL, October 15-18, 2001.

James Falabella, Dawn Kelley, and Nurcan Bac "Gas Separation with Zeolite Beta/PES Mixed Matrix Membranes", *North American Memb. Soc. 12th Annual Meeting Proceedings*, pg. 139, Lexington, KY. May 2001.

Bac, Nurcan, J. Harpster, R.A. Maston, and A. Sacco Jr., "A Low Temperature Furnace for Solution Crystal Growth on the International Space Station" *Space Technology and Applications Forum- Bridging the Future- Space Station and Beyond*, Albuquerque, NM, Jan.30 - Feb 3, 2000.

Sacco A., and N. Bac, "The Center for Advanced Microgravity Materials Processing – A Partnership between NASA, Northeastern University and Industry" *Space Technology and Applications Forum- Bridging the Future- Space Station and Beyond*, Albuquerque, NM, Jan.30 - Feb.3, 2000.

Bac, N., J. Warzywoda, G. Rossetti, Jr., M. Valcheva-Traykova, and A. Sacco, Jr., "Zeolite Crystal Growth in Space", *Materials Research Society, Symp. Proceedings*, Vol 551 pp 245-254, November 1999.

Guray, Marceau, M., Sacco, T.L., Whalen, L.M., Bac, N., Warzywoda, J., and Sacco, Jr., A., "Investigating the Nucleation and Growth of Zeolite Crystals in Space", *STAIR, 3rd Conference on Commercial Development of Space, AIP Conference Proceedings* vol 420, pg.544 Albuquerque, NM, January 1998.

Sacco, Jr., A., Bac, N., Warzywoda, J., Guray, I., Thompson, R.W., and McCauley, L.A., "Zeolite Crystal Growth in Microgravity", *Space Technology & Applications International Forum*, Proceedings of Space Technology and Applications, Albuquerque, NM. January 1996.

Bac, N., Sacco, Jr., A., Thompson, R.W., Dixon, A.G., and McCauley, L.A., "Thermal Design of a Novel Furnace for the Processing of Molecular Sieve Zeolites in Space", 56, S. Güçeri (ed.), *Proc. 1st International Conference on Transport Phenomena in Processing*, Technomic Publishing Company, Lancaster, PA. 1993.

CONFERENCE PRESENTATIONS

Nurcan Bac – Invited Speaker – “Encapsulation of a fragrance molecule in Zeolite X” International Porous and Powder Materials Symp. Sept. 15-18, 2015 Cesme, Izmir, Turkey

Nurcan Bac – Invited speaker “Energy Applications of Nanotechnology” UİG – TASSA Conference December 22-23, 2008 Sabancı Center, İstanbul, Turkey

Yılsar Devrim, Nurcan Bac, İnci Eroğlu, Preparation and Characterization of Sulfonated Polysulfone/TiO₂ Composite Membranes for Proton Exchange Membrane Fuel Cell, 5th Chemical Engineering Conference for Collaborative Research in Eastern Mediterranean Countries, EMCC5, May 24-29 2008

Nurcan Bac “Synthesis of Antibacterial Zeolite-Polyurethane Composites” – Invited Lecture, BIOMED2007 Yeditepe University, Istanbul, 26-28 August (2007) .

Bac, Nurcan, “Composite Membranes for Fuel Cell Applications” GeT Univation – German Turkish University Conference and Project Marketplace , Braunschweig, Germany , 26-27 February (2007).

Eda Ayşe Aksoy, Burcu Akata, Nurcan Bac, Nesrin Hasırcı, “Zeolit Beta-Poliüretan Kompozit Membranlarının Hazırlanması ve Karakterizasyonu”, I. Ulusal Polimer Bilim ve Teknoloji Kongresi, Ankara, 21-23 Haziran (2006).

Rogers, R., C.Ma, S. Mukerjee, and N. Bac “Incorporation of Inorganic Fillers in Composite Membranes for Fuel Cell Applications” International Society of Electrochemistry 55th Annual Meeting, Thessaloniki, Greece 19-24 September (2004).

Bac Nurcan, and J. Falabella "Zeolite A, Beta, ZK-5 and PES Composite Membranes for Gas Separation " Gordon Research Conference, New London, NH Aug. 3-8 (2002).

Falabella, J. and Nurcan Bac "Gas Separation with Zeolite /PES Mixed Matrix Membranes", *North American Memb. Soc.13th Annual Meeting*, Long Beach CA, May (2002).

Kelley, Dawn, Okumus, Emin, and Nurcan Bac "Gas Separation with Zeolite/Polyimide Mixed Matrix Membranes", *North American Memb. Soc.13th Annual Meeting*, Long Beach CA, May 2002.

Bac, N. and A. Sacco Jr., “The Growth of Aluminosilicates In Low Earth Orbit – Future Studies on the International Space Station”, AICHE Spring National Meeting, Houston, TX April 22-26 2001.

Bac N., A. Sacco Jr., “Zeolite Crystal Growth Experiment on ISS” AICHE Spring National Meeting, Houston, TX April 22-26 2001.

Bac, N., “Research in Space”, VIIth ATAS Science and Education Conference, Grand Hyatt Hotel, Washington DC, March 9, 1996.

Sacco, Jr., A., and Bac, N., “Living and Doing Science in Space”, METU-ATAS Conference on Education, Science and Technology, Ankara Turkey, June 27, 1996.

Bac, N., Sacco Jr., A., Thompson, R.W., and Dixon, A.G., "Thermal Design of a Novel Furnace for the Processing of Molecular Sieve Zeolites in Space", Int. Conf. on Transport Phenomena in Processing, Hawaii, March 22-26, 1992.

Bac N., and Sacco, Jr., A., "Thermal Design of a Prototype Furnace for Zeolite Crystal Growth in Space", Clarkson CCDS Annual Meeting, Worcester, MA, June 1990.

Sacco, A., and Bac N., "Zeolite Crystal Growth in Space", Battelle Center for Commercial Development of Space - Advanced Materials Division, Annual Meeting, Mohican State Park, Columbus, OH, September 17-19, 1990.

Guruz, G., Bac, N., and Inanc, E., "The Characterization of Coal Derived Liquids Obtained Under Various Liquefaction Conditions", 9th Miami International Congress on Energy and Environment, Miami, December 11-13, 1989.

Bac, N., Kiran, G., and Gurkan, T., "Gas Separation with Zeolite-Polysulfone Based Composite Membranes", The International Symposium on Gas Separation Technology, Antwerp, Belgium, September 10-15, 1989.

Gurkan, T., Bac, N., Kiran, G., and Gur, T., "A New Composite Membrane for Selective Transport of Gases", 6th International Symposium on Synthetic Membranes in Science and Industry, Tubingen, Germany, September 4-8, 1989.

TECHNICAL REPORTS:

Bac, N., A. Sacco Jr., E.N. Coker, A.G. Dixon, J. Warzywoda, and R.W. Thompson., "The Growth of Zeolites A, X and Mordenite in Space," *Joint "L+1" Science Review for USML-1 and USMP-1 with the Microgravity Measurement Group*, **NASA Conference Publication 3272**, Volume I, Huntsville, AL, USA 1994.

Gurkan, T., Bac, N., and Ozgen, C., "Removal of Moisture from Hydrogen Off Gas in Petkim's Chlor - Alkali Plant", Contract No. 87-03-04-002, Final Report, pg.73., November 1987.

Gurkan, T., Bac, N., Ozgen, C., and Tosun, I., "Energy Optimization in Petkim Petrochemicals VCM Plant", Contract No. 85-03-04-003, Final Report, pg.186., June 1987.

Bac, N., Culfaz, A., and Yucel, H., "Removal of Mercury Vapor from Hydrogen Off Gas in Petkim's Chlor-Alkali Plant in Yarimca", Contract No. 85-03-04-004, Final Report, pg.62, July 1986.

Hammarstrom, J.L., Bac, N., and Sacco, Jr., A. "Method for Determining Catalytic Activity of ASC Whetlerite Carbon Beds", Final Report, Contract DAAK-82-C-0050, pg.114, USARRADCOM Aberdeen Proving Ground, Edgewood, Maryland, USA, 1983.

Bac, N., "Overall Material Energy Balances in Cement Plants", United Nations Industrial Development Organization (UNIDO), In-Plant Training Seminar, Cement Manufacturer's Assoc. Ankara, May 1983.

Bac, N., "Principles of Proportioning of Raw Materials in Cement Manufacture", United Nations Industrial Development Organization (UNIDO), In-Plant Training Seminar, Cement Manufacturer's Assoc. Ankara, May 1983.

U.S. Department of Army Research and Development Command (USARRADCOM) Contract # DAAK11-80-C-0103 (Noting that these reports go through an internal technical review, are then printed, and are available to the public through Defense Documentation Center, Cameron Station, Alexandria, Virginia):

- a) Final Report (Oct. 1, 1981 - Jan. 1, 1982) "Residual Life Method for Determining Gas Protection of ASC Whetlerite Carbon Beds," (with J. Hammarstrom and A. Sacco Jr.), pg.107., Aberdeen Proving Ground, Edgewood, Maryland, USA 1982.
- b) Quarterly Progress Report No. 4 (June - October 1981) "Residual Method for Determining Gas Protection of ASC Whetlerite Carbon Beds," (with J. Hammarstrom and A. Sacco Jr.). CSL#ARCSL-CR-81081.
- c) Quarterly Progress Report No. 3 (April - June 1981) "Residual Life Method for Determining Gas Protection of ASC Whetlerite Carbon Beds", (with J. Hammarstrom and A Sacco Jr.). CSL#ARCSL-CR-81080.
- d) Quarterly Progress Report No. 2 (January - March 1981) "Residual Life Method for Determining Gas Protection of ASC Whetlerite Carbon Beds", (with J. Hammarstrom and A. Sacco Jr.). CSL#ARCSL-CR-81079.
- e) Quarterly Progress Report No. 1 (October - December 1980) "Residual Life Method for Determining Gas Protection of ASC Whetlerite Carbon Beds", (with J. Hammarstrom and A. Sacco Jr.). CSL#ARCSL-CR-81078.

RESEARCH SUPERVISION:

M.S. Thesis's Supervised:

- ◆ Yurdakul, Ahmet Ozgur "*Development of Polybenzimidazole Membranes for High Temperature Fuel Cells*" METU, Ankara June 2007.
- ◆ Erdener Hülya "*Development of Organic-Inorganic Composite Membranes for Fuel Cell Applications*" METU, Ankara June 2007.
- ◆ Nadiye Gür "*Synthesis of Zeolite Beta for Composite Membranes*" METU, Ankara September 2006.

- ◆ Reginald Rogers, “Inorganic/organic *Nanocomposite Membranes for Fuel Cells*”, Northeastern University, Boston, MA, March 2004.
- ◆ Servet Nadirler, “*Polyimide/polyetherketone-Zeolite Hybrid Membranes for Gas Separation*”, Northeastern University, Boston, MA, Sept. 2004
- ◆ James Falabella, “*Gas Separation with Zeolite/PES Mixed Matrix Membranes*”, Northeastern University, Boston, MA, 2003.
- ◆ Dawn Kelley, “*Novel Polyimide-Zeolite Mixed Matrix Membranes for Gas Separation*”, Northeastern University, Boston, MA, 2002.
- ◆ Turgut Battal, “*Effect of Feed Composition on Separation Characteristics of Zeolite-Polymer Mixed Matrix Membranes*”, METU, Ankara, Turkey, 1994.
- ◆ Murat Gokce Suer, “*Gas Permeation Studies with Novel Polymer-Zeolite Membranes*”, METU, Ankara, Turkey, 1993.
- ◆ Gunin Akkor, “*Characterization of Polyethersulfone-Zeolite X Composite Membranes for Gas Separation*”, METU, Ankara, Turkey, 1988.
- ◆ Ilker Ozal, “*Computer-Aided Thermal Design of Shell and Tube Heat Exchangers*”, METU, Ankara, Turkey, 1988.
- ◆ Bilge Isikkent, “*Energy Conservation in Distillation by Process Integration*”, METU, Ankara, Turkey, 1987.
- ◆ Emel Inanc, “*Characterization of Coal Derived Liquids from Mengen Lignites*”, METU, Ankara, Turkey, 1987.
- ◆ Mehmet Sacit Erdem, “*Liquefaction Characteristics of Turkish Lignites*”, METU, Ankara, Turkey, 1986.
- ◆ Turkan Gultop, “*Modeling of Breakthrough in Charcoal Filters by Orthogonal Collocation Method*”, METU, Ankara, Turkey, 1985.

Ph.D. Thesis Supervised:

- ◆ Sinan Katnaş, “*Mathematical Modeling of Pulverized Coal Fired Power Plant Furnaces*”, METU, Ankara, Turkey, 1994.
- ◆ Ramiz Gültekin Akay, “*Zeolite Polymer Composite Membranes for High Temperature Fuel Cells*” METU Ankara, Turkey February 2008

- ◆ Zeynep Ustaoglu “Development and Characterization of Antimicrobial composites containing Zeolites” Yeditepe University , Istanbul Turkey , January 2013
- ◆ Rumeysa Tekin “ Microencapsulation Processes for Olfactory Applications” Yeditepe University, Istanbul, Turkey, August 2014

COURSES LECTURED:

At Northeastern University, Worcester Polytechnic Institute , Yeditepe, and METU,

Undergraduate courses:

- Chemical Process Principles
- Fluid Mechanics
- Heat Transfer
- Mass Transfer
- Separation Processes
- Chemical Engineering Design I & II

Graduate courses:

- Advanced Heat Transfer
- Petroleum Refinery Engineering
- Computer Aided Process Design
- Kinetics and Catalysis
- Transport Phenomena