

RACHID MABROUK
Ph.D, M.Sc. in Chemical Engineering

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WORK EXPERIENCE

The Linde Group, Munich - Germany

October 2012-Present

EMEA-HyCO Manager

Front-End Technology Expert

- Technology scouting & screening for synthesis gas and downstream applications
- Technico economical chemical processes evaluation
- CO₂ post capture technologies evaluation.

Haldor Topsoe, Copenhagen - Denmark

September 2007-October 2012

Development Engineer

- Responsible for process developments and basic engineering design of syngas generation technologies
- Responsible for the revamp of high pressure syngas pilot test-rig at Topsoe's R&D division.

Research Engineer

- Kinetic models development for several new solid catalysts
- Investigated methanol conversion to fuel/olefins.

DuPont, Kingston Ontario, Canada

April 2007-August 2007

Research Scientist

- Development of new chemical process for olefin bio-based product synthesis.

Ecole Polytechnique, Montréal - Canada

April 2006-March 2007

Post-doctoral

- Natural gas combustion in fluidized bed – Application: Ore roasting

Teaching Assistant

- During my Ph.D. project, I had the opportunity to teach with responsibilities (Lecturing, exams preparation and assignments grading) for the different courses.

ICS-UNIDO, Trieste - Italy

March 2000-August 2001

Process Engineer

- Essential oil separation processes simulation and evaluation.

INDUSTRIAL PROJECTS

- Project Manager, TOTAL A/S, LeHavre - France** *June - July 2006*
- Fiber optic probe as reliable measurement tool for gas solid hydrodynamic characterization
- Project Engineer, Exxon Mobil, R&D division, Houston, USA** *February -April 2004*
- Non-intrusive technique for computational fluid dynamic CFD validation
- Project Engineer, Enviromondial Inc., Montreal - Canada** *July -November 2003*
- Gasification process evaluation, for organic waste conversion
- Project Engineer, Ecolomondo, Montreal - Canada** *May-August 2002*
- Technico-economical evaluation, of pyrolysis process for organic waste conversion

EDUCATION

Ph.D. Chemical Engineering

Ecole Polytechnique de Montréal, Canada *January 2002-March 2006*

Thesis: Hydrodynamics of Internal Circulating Fluidized Beds (ICFB)
Supervisors: Dr. Jamal Chaouki and Dr. Christophe Guy

M.Sc. Chemical Engineering

Ecole Mohammadia d'Ingénieurs, Rabat - Morocco *January 1998-April 2001*

Thesis: Lemon Peel Oil Extraction – Thermodynamic properties estimations and process simulation
Supervisors: Dr. Maurizio Fermeglia and Dr. Tijani Bounahmidi

B.Sc. Fluid Mechanics

University Ibnou Zohr, Agadir - Morocco *September 1993-June 1997*

AWARDS & SKILLS

Ecole polytechnique de Montréal, scholarship *2002 - 2006*
University postgraduate scholarship, Moroccan government *1998 - 2000*
University Ibnou Zohr, major award *1997*

- Simulators: ASPENPLUS, PROII & UNISIM
- Programming: Fortran, Matlab
- Languages: Arabic, English, French, Italian, German (Berlitz Level 3)

COMMUNICATIONS & REPORTS

Patents

- US20170152219A1, 2017, R. Mabrouk, K. Wawrzinek, C. Voss, J. Schwarzhuber, A. Seliger, B. Schurer and G. Salazar Duarte, 'Method for the Manufacture of UREA'
- US20170022057A1, 2017, H. Ranke, M. Guzmann, R. Mabrouk and U. Heucke, 'Process for Generating Syngas from CO₂ Rich Hydrocarbon-Containing Feed Gas'
- US9475696B2, 2016, R. Mabrouk, K. krishnamurthy, 'Methods for Producing Synthesis Gas for Ammonia Production'
- US20160288074A1, 2016, R. Mabrouk, W. Vogel, V. Lemme and A. Seliger, 'E-Hybrid Steam Methane Reforming'
- US20160289071A1, 2016, R. Mabrouk, W. Vogel, V. Lemme and A. Seliger, 'E-Hybrid Reforming'
- US20150259202A1, 2015, Ib Dybkjaer, R. Mabrouk, K. Aasberg-Petersen, C. Niels Schjodt, 'Process for the Production of Synthesis Gas'
- US20150291437A1, 2015, R. Mabrouk, K. krishnamurthy, 'Methods for Producing Synthesis Gas for Ammonia Production'
- US20150307351A1, 2015, R. Mabrouk and J. Naumovitz, 'Tail gas upgrading for synthesis gas generation'
- US20150260029A1, 2015, R. Mabrouk and H. Ranke 'Integrated Process for Enhanced Oil Recovery Using Gas to Liquid Technology'
- US8440855B2, 2013, B. Voss, R. Mabrouk and C. Hviid Christensen, 'Process for production of acetic acid and vinyl acetate monomer'
- US8067474B2, 2011, N. Poul Erik Hojlund, R. Mabrouk, J. Finn, M. Jorgen, H. John Bogild and E. Lauge Sorensen, 'Process for preparation of hydrocarbons from oxygenates'
- US20110137074A1, 2011, B. Voss, R. Mabrouk and C. Hviid Christensen, 'Process for production of acetic acid and vinyl acetate monomer'
- EP3075703A1, 2016, H. Ranke, M. Guzmann, R. Mabrouk and U. Heucke, 'Verfahren zur Erzeugung von Synthesegas aus einem CO₂-reichen, kohlenwasserstoffhaltigen Einsatzgas'
- EP2233460A1, 2010, N. Poul Erik Hojlund, R. Mabrouk, J. Finn, M. Jorgen, H. J. Bogild and E. Lauge Sorensen, 'Process for preparation of hydrocarbons from oxygenates'
- US9790433B2, 2017, A. Heinzl, R. Mabrouk, 'process for producing synthesis gas'

Papers in international journals

- R. Mabrouk, J. Chaouki and C. Guy, 'Wall Surface Effect On Particle-Wall Friction Factor In Upward Gas Solid Flows', *Powder Technology, Volume 186, Issue 1, 1 August 2008, Pages 80-88.*
- R. Mabrouk, J. Chaouki and C. Guy, 'Exit effect on hydrodynamics of the internal circulating fluidized bed riser', *Powder Technology, Volume 182, Issue 3, 10 March 2008, Pages 406-414.*

- R. Mabrouk, J. Chaouki and C. Guy, 'Effective drag coefficient investigation in the acceleration zone of an upward gas–solid flow', *Chemical Engineering Science*, Volume 62, Issues 1-2, January 2007, Pages 318-327.
- R. Mabrouk, R. Radmanesh, J. Chaouki, and C. Guy (2005) "Scale Effects on Fluidized Bed Hydrodynamics," *International Journal of Chemical Reactor Engineering*, Vol. 3: A18. <http://www.bepress.com/ijcre/vol3/A18>
- R. Radmanesh, R. Mabrouk, J. Chaouki, and C. Guy (2005)"Effect of Temperature on Solids Mixing in a Bubbling Fluidized Bed Reactor," *International Journal of Chemical Reactor Engineering*, Vol. 3: A16. <http://www.bepress.com/ijcre/vol3/A16>

Key note papers in conferences

- R. Mabrouk, J.P. Laviolette, G.S. Patience and J. Chaouki, 'On Natural Gas Combustion in Fluidized bed', keynote paper presented at 9th International Conference on Circulating Fluidized Beds-CFB9, Hamburg, Germany, May 13-17, 2008.
- R. Mabrouk, J. Chaouki and C. Guy, 'Particle Wall Friction Factor In Upward Gas Solid Flows', keynote paper presented at 8th International Conference on Circulating Fluidized Beds-CFB8, Hangzhou, China, May 5-8, 2005.
- R. Mabrouk, J. Chaouki and C. Guy, 'Drag Coefficient Investigation in the Upward Gas–Solid Flow', keynote paper presented at CRE X- Chemical Reaction Engineering X: Innovation in Chemical Reactor Engineering, Zacatecas- Mexico, August 28-September 2, 2005.

Chapters in books

- J.P. Laviolette, R. Sotudeh-Gharebagh, R. Mabrouk, G.S. Patience and J. Chaouki, 'Fluidized Bed Combustion of Natural Gas and Other Hydrocarbons', Handbook of Combustion, Wiley-VCH Books 2009.

Industrial reports

- R. Mabrouk, J. Chaouki, 'Natural gas for phosphate calcinations in fluidized bed'. Industrial report for the Fertilizer Company OCP, April 2007.
- R. Mabrouk, J. Chaouki, 'Hydrodynamic characteristics of pilot scale turbulent fluidized bed, using different fiber optic probes'. Industrial report for CERT-Total, LeHavre, July 2006.
- R. Mabrouk, J. Chaouki, 'Hydrodynamic characteristics of pilot scale slurry reactor, using radioactive particle tracking technique'. Industrial report for Exxon Mobil, Huston, July 2004.
- R. Mabrouk, J. Chaouki, 'Techno-economic evaluation of tire pyrolysis breakthrough technology', Industrial report for Ecolomondo, Montreal, August 2002.