

Department of Chemical Engineering
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Rodolfo Rodrigues, MSc Eng

PhD-student in Chemical Engineering at *Federal University of Rio Grande do Sul* (UFRGS) working with the analysis of multipurpose coal-biomass gasification systems. In my Master studies applied kinetic and equilibrium models to improve performance of a combined gasifier-combustor pilot unit for leather wastes processing.

Major interesting fields: Modeling and simulation of processes, Virtual biorefinery, Biomass (co)gasification and combustion, Thermal treatment of solid wastes.

Professional Experience

- 2010–Present* *Research project:* Oxy-combustion of Brazilian coals in fluidized-bed reactor.
Activity: Simulation of operational conditions to (co)gasification/(oxy)combustion of Brazilian coal and biomass. Development of tools to simulation using Cantera libraries (<http://cantera.googlecode.com>) and Python.
Unit: Laboratory of Residues Processing (LPR) at UFRGS.
- 2010–2011* *Teaching experience:* Substitute teacher of technical course in Chemistry at area of Chemical Processes.
Unit: Federal Institute of Technology of Rio Grande do Sul (IFRS), Porto Alegre.
- 2007–2010* *Research project:* Numerical and experimental evaluation of gasification and combustion process of biomass wastes to electric generation in thermal cycles.
Activity: Experimental data acquisition. Modeling and simulation of gasification system using EMSO (an equation-based simulator). Model validation.
Unit: Laboratory of Residues Processing (LPR) at UFRGS.
- 2004–2007* *Research project:* ALSOC — Chemical and petrochemical process simulator.
Activity: Improvement of the model library of EMSO process simulator. Creation of a library of chemical reactor models. Collaborative project between universities (UFRGS, UFRJ, and USP) and petrochemical companies (PETROBRAS, REFAP, BRASKEM, and Innova). Project website: <http://www.enq.ufrgs.br/alsoc>
Unit: Group of Intensification, Modelling, Simulation, Control and Optimization of Processes (GIMSCOP) at UFRGS.

Scientific Journal Reviewer

- 2010–Present* International Journal of Chemical Reactor Engineering, ISSN: 1542-6580

Technical Skills

Scientific languages: Python, Matlab scripting, C++
Process simulators: EMSO, gPROMS, Aspen Plus/Dynamics
CFD tools: OpenFOAM, MFIX, CFX

Formal Education

- 2009–Present* PhD in progress in Chemical Engineering.
Federal University of Rio Grande do Sul (UFRGS). Porto Alegre, Brazil.
Title: *Multipurpose gasifier: Viability and design of an automated unit for small-scale production.*

- 2005–2008 Master in Chemical Engineering.
Federal University of Rio Grande do Sul (UFRGS). Porto Alegre, Brazil.
Title: *Modeling and simulation of a fixed-bed gasifier to thermal treatment of solid wastes from footwear industry.*
- 2000–2004 Graduation in Chemical Engineering.
Federal University of Santa Maria (UFSM). Santa Maria, Brazil.

Complementary Education

- 2011–2011 Waste-to-energy short course (credit hours: 24h).
Brazilian Combustion Network (RNC), Brazil.
- 2010–2010 Gasification – CFD/Process short course (credit hours: 40h).
Use of tools (MFiX and Aspen Plus) for simulation of coal gasification systems.
National Energy Technology Laboratory (NETL), USA.
Association of Coal Industry of Santa Catarina (SACT), Criciuma, Brazil.
- 2007–2008 HSE Engineering (credit hours: 376h).
Mobilization Program of Brazilian Oil & Gas Industry (PROMINP).
Post-graduation Program in Production Engineering at UFRGS, Porto Alegre, Brazil.

Participation in Events (last 5 years)

- International Conference on Coal Science & Technology. Oviedo, Spain, 2011.
- 3rd Brazilian Coal Congress. Gramado, Brazil, 2011.
- 3rd School of Combustion. Salvador, Brazil, 2011.
- 27th Annual Pittsburgh Coal Conference. Istanbul, Turkey, 2010.
- 10th International Symposium on Process Systems Engineering. Salvador, Brazil, 2009.
- 17th Brazilian Congress of Chemical Engineering. Recife, Brazil, 2008.

Publications (last 5 years)

- [1] R. Rodrigues, N. R. Marcilio, J. O. Trierweiler, and M. Godinho. Thermodynamic efficiency analysis of gasification of high ash coal and biomass. In *International Conference on Coal Science & Technology*, Oviedo, Spain, 2011.
- [2] R. Rodrigues, N. R. Marcilio, J. O. Trierweiler, M. Godinho, and A. M. S. Pereira. Co-gasification of footwear leather waste and high ash coal: A thermodynamic analysis. In *27th Annual International Pittsburgh Coal Conference*, Istanbul, Turkey, 2010.
- [3] R. Rodrigues, R. P. Soares, and A. R. Secchi. Teaching chemical reaction engineering using EMSO simulator. *Computer Application in Engineering Education*, 18(4):607–618, 2010. DOI: 10.1002/cae.20255
- [4] R. Rodrigues, A. R. Secchi, N. R. Marcilio, and M. Godinho. Modeling of biomass gasification applied to a combined gasifier-combustor unit: Equilibrium and kinetic approaches. *Computer Aided Chemical Engineering*, 27(A):657–662, 2009. DOI: 10.1016/S1570-7946(09)70330-X
- [5] R. Rodrigues, A. R. Secchi, N. R. Marcilio, and M. Godinho. Simulation of a fixed-bed gasifier to thermal treatment of solid wastes from footwear industry (in Portuguese). In *17th Brazilian Congress of Chemical Engineering*, Recife, Brazil, 2008.
- [6] R. Rodrigues, R. P. Soares, and A. R. Secchi. A collection of 10 typical numerical problems in Chemical Engineering solved by EMSO simulator (in Portuguese). In *17th Brazilian Congress of Chemical Engineering*, Recife, Brazil, 2008.