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Process Simulation of Reactor Using Open Source - A Review

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Abstract: Process simulation is a successful tool for design, optimization and control of chemical processes. Chemical industry process simulations support the entire life cycle of a chemical process from development, design and construction to optimization of operation. Reactors are usually the heart of the chemical processes in which relatively cheap raw materials are converted to more economically favorable products. Reactions play essential safety and environmental protection roles. Proper design and operation of the reactor is required to provide the desired outcome. We study the various types of reactors use in the simulation and also various simulations software use for reactor simulations. DWSIM is the open media simulators use to simulate various unit operations and processes like reactors, distillation, heat exchangers, adsorption column etc. There various types of reactor gives the outlet property of reactions by simulating them in to simulators. Like DWSIM lot of chemical simulators are available some paid version and some of open media like DWSIM. Conversion reactor are use for calculating conversion of reaction. Similarly Gibbs and equilibrium reactors are used to calculate equilibrium constant.

Keywords: Reactor, Process Simulation, Modeling and Simulation, Open Media.

REFERENCES

[1]. Anu Maria, Introduction to Modelling and Simulation, State University of New York at Binghamton Department of Systems Science and Industrial Engineering Binghamton, NY 13902-6000, U.S.A., proceeding the 1997 winter simulation conference.

[2]. Antonio Tripodi , Matteo Compagnoni, Rocco Martinazzo , Gianguido Ramis and Ilenia Rossetti, Process Simulation for the Design and Scale Up of Heterogeneous Catalytic Process: Kinetic Modelling Issues, Department of Chemical, University delis Study of Milano, CNR-ISTM and INSTM Unit Milano-University, I-20133 Milan, Italy and Department of Chemical, Civile ed Ambiental, University delis Studi di Genova and INSTM Unit Genova, I-16029 Genoa, Italy, Catalysts 2017, 7, 159.

[3]. Dr. Pradeep Bhatia and Jagat Kumar, System Models and System Simulation, System Simulation and Modeling, MCA - Modelling and Simulation.

[4]. 4.Edward M. Rosent And Allen C. Pauls, Computer Aided Chemical Process Design: The Flow Tran System, Monsanto Company, 800N. Lindbergh, St. Louis, MO 63166, U.S.A., Computers end Chemical Engineering, Vol. I. pp. 11-21. Pergamon Press, 1977. Printed in Great Britain.

[5]. Hanaâ Er-rbib and Chakib Bouallou, Modelling and Simulation of Methanation Catalytic Reactor for Renewable Electricity Storage MINES Paris Tech, CES - Centre Efficacité énergétique des Systems, 60, Bd Saint-Michel 75006 Paris chakib, Chemical Engineering Transactions, VOL. 35, 2013.

[6]. Introduction to Thermodynamic Methods for Process Engineering, Choice of a thermodynamic model and simulation, Baptiste Bouillot Version: 2020-2021.

[7]. J. Javaloyes, A. Carrero, N. Quirante, Introduction To Chemical Process Simulators, DWSIM Chemical Process Simulator, October 2016.

[8]. Jorge Buitrago, Dario Amaya and Olga Ramos, Model and Simulation of a Hydrotreatment Reactor for Diesel Hydrodesulfurization in Oil Refining, Nueva Granada Military University, Faculty of Engineering in

Mechatronics Grupo de Applications Virtuales – GAV, Bogotá, Colombia, Contemporary Engineering Sciences, Vol. 10, 2017, no. 25, 1245 – 1254.

[9]. Krishna B., Modelling and Simulation in chemical engineering Srihari Assistant Professor Department of Chemical Engineering National Institute of Technology Srinagar.

[10]. Lousada Bernardo Rangel , Process Design and Simulation of Propylene and Methanol Production through Direct and Indirect Biomass Gasification, A dissertation submitted to the graduate faculty of Auburn University in partial fulfillment of the requirements for the degree of Master in Chemical Engineering Auburn, Alabama August 6, 2016.

[11]. Maayedukondalu Telagam Setty, Steady state simulation of continuous stirred tank reactor (CSTR) system using Aspen Plus, Bachelor of Technology in Chemical Engineering, Department of Chemical Engineering National Institute of Technology Rourkela May 2015.

[12]. Mrs. Kirti Bhushan Zare1 , Ramteke Sayali Sunil2 , Mohite Sapna Anil, Modelling And Simulation Of Saponification Reaction In Different Type Of Reactor, Chemical Engineering, D.Y. Patil Institute of Engineering, Management and Research, Akurdi, Pune, (India) IJAETS, Vol 5, Issue 4, Aug 2017.

[13]. Naren. P. R. (Dr), Process Simulation Using DW SIM: A Free and Open Source Chemical Process Simulator, Senior Assistant Professor, Chemical Engineering, School of Chemical and Biotechnology SASTRA Thanjavur 613 401, Tamil Nadu, December 2017.

[14]. Nayef Mohamed Ghasem, and Abdulrahman Yaqoub Alraeesi, Modelling and Simulation of Hydrogen Production via Water Gas Shift Membrane Reactor, International Journal of Chemical Engineering and Applications, Vol. 9, No. 4, August 2018.

[15]. Rahma Fadilla Noor, Simulation of CO2 Conversion into Methanol in Fixed-bed Reactors: Comparison of Isothermal and Adiabatic Configurations, Reaktor, ISSN 0852 – 0798 ,Vol. 19 No. 3, September, 2019.

[16]. R. Fatoni, Modeling Biomass Gasification in a Fluidized Bed Reactor, Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management Bali, Indonesia, January 7 – 9, 2014.

[17]. Robert Currie, Design and Simulation of Novel Sabatier Reactors for the Thermocatalytic Conversion of CO2 into Renewable Natural Gas, A thesis presented to the University of Waterloo in fulfillment of the thesis requirement for the degree of Master of Applied Science in Chemical Engineering Waterloo, Ontario, Canada, 2019.

[18]. Telagam Setty Maayedukondalu, Steady state simulation of continuous stirred tank reactor (CSTR) system using Aspen Plus, Department of Chemical Engineering National Institute of Technology Rourkela May 2015.

[19]. Udonne, J.D. and Balogun F.O, Optimization Of Synthesis Gas (Autothermal) Reactor In Methanol Production Process Using Natural Gas As Feed Stock, International Journal of Scientific & Engineering Research, Volume 7, Issue 3, ISSN 2229-5518, March-2016.

[20]. Book - Mark E. Davis and Robert J. Davis, Fundal11entals of Chel11ical Reaction Engineering, McGraw-Hill Higher Education.