

## Processes and Packings that Are Used in (Styrenemonomer/ Ethylbenzene) Packed Distillation Columns

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### Abstract

World war period witnessed a boom in styrene demand due to its application in the manufacture of synthetic rubber. This led to a dramatic increase in styrene capacity. Since then demand and capacity have grown continuously. There is various Technologies for Styrene monomer production. ABB-lummus/Uop, Epi Europa and Shaw stone&Webster badger Technologies are samples of them. These Technologies used of Ethylbenzene dehydrogenation method. Ethylbenzene hydroperoxidation is other Technology. Present investigation discusses first type (Ethylbenzene dehydrogenation methods). Then various packing types used in Styrene monomer/Ethylbenzene separation, is discussed. Today, more than 70% of the world capacity for styrene monomer distillation have been equipped by Mellapak structured packings. Maxpak, Sulzer BX and Intalox structured packing are in the next grades.

**Keywords:** Styrene Monomer, Ethylbenzene, Separation, Packed Distillation Column, Trayed Distillation Column, Styrene Monomer Production Technologies, Packing



## Study and Specify Reactor Operating Variables of Hydrodesulphurization Unit for Gas Condensate Sweetening of Sarakhs Gas Refinery with Using HYSYS Software

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### Abstract

There are a lot of methods to liquid sweetening with respect of properties of each stream (Feed). With know the application and the limitation of each methods and properties of gas condensate of SARAKHS gas refinery, caustic washing and hydrodesulphurization (HDS) processes were selected for this sweetening. Trickle bed reactor of this unit plays an important role to reduce the sulfur content for sweetening. Hence in this article, specify of effective variables on increasing reactor yield was studied. The effect of four variables such as temperature, pressure, volume and length to diameter ratio was studied with using simulation in HYSYS environment. Results of this simulation revealed that working with reactor under following conditions such as  $T=350^{\circ}\text{C}$ ,  $P=30$  bar,  $V=20$  m<sup>3</sup> and  $L/D=10$  have best reactor yield to reduce sulfur content. At final accuracy of simulation results were compared with another experimental result.

**Keywords:** Sweetening, Gas Condensate, Hydrodesulphurization, Trickle Bed Reactor, Simulation

## A Study on the Kinetic of DME Synthesis from Syngas

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### Abstract

*In the present study the reaction kinetic and modeling of the reactor for syngas transformation into dimethyl ether using a mixture of a metallic oxides, (CuO, ZnO, Al<sub>2</sub>O<sub>3</sub>) and an acidic component ( $\gamma$ -Al<sub>2</sub>O<sub>3</sub>) as the catalyst has been investigated. A combination of Graff kinetic model for methanol synthesis and Bercic model for methanol dehydration was correlated with the experimental results obtained in this study. The parameter estimation has been done using a set of experimental data. Then, a fixed bed reactor was modeled with estimated parameters. The comparison of results to experimental data confirms the accuracy of model.*

**Keywords:** Dimethyl Ether, Direct Synthesis, Kinetic Parameter Estimation



## A Comprehensive Review of Preparation, Application and Future Direction of Carbon Membranes

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### Abstract

*Among separation methods, specially gas separation, the membrane separation process has been developed by researchers in last decades due to their advantages such as lower energy consumption, possibility of separation processes and operation in environmental temperature, simple accessibility of the separated phases, artless operation and installation and no requirement to use chemical materials for separation which results in environmental problems due to consumption of chemical materials.*

*Although, carbon membranes in membrane based gas separation processes have been attended by researchers because of their suitable permeability and selectivity and high stability in corrosive and elevated temperature environment, they suffer from some problems such as frangibility and high cost fabrication that don't permit their application in extreme conditions. Carbon membranes are one type of porous inorganic membranes. This article reviews the fabrication methods of carbon membrane and considers its most effective process parameters. Therefore, at first, this paper reviews the fabrication steps of carbon membranes, i. e., precursor selection, polymeric membrane preparation, pretreatment of the precursor, pyrolysis process and post-treatment of pyrolyzed membrane and then introduces the application of carbon membranes in gas separation processes. Finally, the advantages and disadvantages of carbon membranes are discussed*

**Keywords:** Carbon Membrane, Gas Separation, Inorganic Membrane, Pyrolysis

# Comparison Between Absorption Techniques and Permeable Membranes for Recovery of Carbon Dioxide from Post-Combustion Processes

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## Abstract

Today, processes of the recovery of carbon dioxide from combustion operations, for limiting greenhouse gas emissions, have attracted significant attraction. To this purpose, separation processes such as dense polymeric membranes are not suitable. Scientific studies shows that absorption processes are the best available technology. This paper aims to compare the processes of amine absorption with dense polymeric membranes while they are used in applications such as post combustion for flue treatment. Scientific and technological challenges are discussed. The results of investigation allow one to conclude that dense polymeric membranes are less capable to apply in order to overcome flue gas treatment problem.

**Keywords:** Recovery of Carbon Dioxide, Separation, Post Combustion Process, Absorption, Membrane, Selectivity



# Practical Evaluation of Sand Consolidation in Oil Wells by Various Methods

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## Abstract

Problems of sand migration because of the extraction from oil wells lead to propose some ways for controlling sand migration near the well. In this research, first the proper resins were chosen as the consolidators by studying the resources and evaluating them. After preparing the resins, the necessary phases for making samples were performed. So first a template for making samples was prepared by using pulika pipe. In the first method, the cemented samples were prepared by mixing different kinds of bought resins and different percentages of sand. In the second method, two resins were chosen for the consolidation and samples were prepared as follows: first a certain amount of sand was poured into a template and made a sand pack, then the resin and solvent was used for the sand consolidation. Finally, permeability rate, porosity percentage and compressive strength of the prepared samples were measured based on the available standard methods. The obtained experimental data showed that for these methods, the permeability, porosity and compressive strength of the core samples are retained in acceptable values.

**Keywords:** Compressive Strength, Permeability, Resin Injection, Sand Consolidation, Solvent

## Applications of Lattice Boltzmann Method in CFD Simulations

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### Abstract

CFD as a powerful tool for flow simulation is used for design and troubleshooting of processes by researchers and engineers. Beside the many advantages of CFD, one of the problems is time consuming of this simulation scheme especially in complex geometries such as porous media. Lattice Boltzmann Modeling (LBM) as a new approach has been developed recently as a solution for this difficulty. In this work, LBM has been introduced as a new approach for flow simulations through complex geometries. The limitations, advantages and difference of this method with other conventional methods in CFD have been discussed. Some applications of LBM have been reported finally.

**Keywords:** Computational Fluid Dynamics (CFD), Lattice Boltzmann Method (LBM), Mesoscopic Scale



## Recent Methods for Membrane Treatment of Landfill Leachate

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### Abstract

Pollution of underground water due to landfill leachate is a major environmental problem. The discharge of leachate into the environment without any treatment results in a reduction in nitrate oxidation leading to formation of dangerous ammonia. Nowadays individual or hybrid techniques via single or multi-stage systems are employed for treatment of landfill leachate. Biological treatment is not able to destroy all non-decomposable organics. The treated waste with a high COD is not suitable for discharge into the environment. Accordingly physico-chemical processes are required as pre-treatment, post-treatment or treatment techniques. Membrane processes are able to treat the landfill leachate efficiently. The membrane permeate may be discharged into the rivers or surface water without the requirement of further treatment. The process is technically and economically feasible. The combination of membrane and biological processes enhances the quality of the product.

**Keywords:** Leachate, Membrane Treatment, Landfill, Reverse Osmosis

# Modeling and Simulation of Alumina Drying Process in Spray Dryer With Co-Current Flow

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## Abstract

*Spray dryers are one of the most important dryers and have many applications in the food, drug and chemical industries. In this investigation, a model is suggested to predict the product temperature, drying time and the dryer height in order to evaluate the dryer performance in different operational conditions. To achieve this, knowledge of the drying kinetics and the transfer phenomenon are necessary. The main aim in this project is, modeling of the spray drying of Alumina Slurry in a co current dryer.*

*In this modeling Mass, heat and momentum transfer equations on droplets and hot air have been written. By writing a computer program for the simultaneous solution of mass, energy and momentum balances, a mathematical model is introduced. In order to evaluate the accuracy of the model, the experimental data were used and results showed good agreement between the theory and the experiments. By using the results of the model, the change in the dryer input parameters and their effect on final product characterizations have been studied.*

**Keywords:** Alumina, Slurry, Spray Dryer, Modeling