

## Synthesis and Morphological Investigation on Ziegler-Natta Spherical Catalyst

Z. Hadi<sup>1\*</sup>, M. Monji<sup>2</sup>, M. Maddah Ali<sup>3</sup>

1. Engineering Department, Razi Chemistry Research Center, Azad University,  
Shahreza Branch, Isfahan, Iran

2. Polymer Engineering Department, Amirkabir University of Technology, Tehran, Iran

3. Fara polymer Engineering Co., Isfahan, Iran

E-mail: Zhadi@iaush.ac.i

### Abstract

*polyolefins are the main product of polymerization industry. Since catalyst has the most important role in polymerization industry and on the other hand, morphology and properties of produced polymers are highly dependent on the catalyst properties and morphology. In this paper the effect of stirrer speed, Alcohol/MgCl<sub>2</sub> molar ratio and adduct injection time to the second reactor on the spherical catalyst support were investigated. Result show with increasing the injection time, Particle size average (PSA) of catalyst increased. On the other hand, with increasing in the stirrer speed, PSA decreased. Increasing the alcohol content results in decreasing the PSA of catalyst.*

**Keywords:** Catalyst, Ziegler-Natta, Morphology, Slurry Polymerization



## Investigation of Milk Cholesterol Reduction Using both Free and Immobilized Lactobacillus Acidophilus ATCC1643 in Sodium-Alginate

S. Serajzadeh, I. Alemzadeh

Chemical & Petroleum Engineering Department, Sharif University of Technology, Tehran, Iran

E-mail: alemzadeh@sharif.edu

### Abstract

*Lactobacillus acidophilus is one of the major microorganisms which are famous for their effects on cholesterol. In this study we have investigated the effect of lactobacillus acidophilus ATCC1643 on removing the milk cholesterol and additionally we have immobilized lactobacillus acidophilus ATCC1643 cells in sodium-alginate and observed its effect on milk cholesterol removing. Also, we have researched about the effect of some factors including: bacteria cells number (both free and immobilized cells) and immobilized cells bead size on cholesterol removing rate and ultimately the extracted results were compared together. The results presented that free cells could reduce cholesterol to lower than 0.5mg/100ml milk. Also, smaller bead size resulted higher cholesterol reduction. Increasing the number of immobilized cells showed significant effect on cholesterol removal to about 96%. Also reusability of the beads showed that immobilized cells are active in cholesterol processing for three times.*

**Keywords:** Lactobacillus Acidophilus, Cholesterol Reduction, Immobilization, Milk

## Preparation of Polypyrrole and Polyaniline and their Composites for the Removal of Cadmium from Water

S. A. Mozaffari, H. Eisazadeh\*

Chemical Engineering Department, Engineering Faculty, Noshirvani University of Technology, Babol, Iran

Email: eisazade@yahoo.com

### Abstract

*In this research, the effect of polypyrrole and polyaniline and their composites in the removal of cadmium from aqueous solution were investigated. Also, the effect of type and concentration of stabilizer, pH of solution and type of adsorbent on the removal of cadmium were studied. By comparison between polyaniline and polypyrrole the results indicate that the removal percentage of cadmium by using polyaniline and polypyrrole were 99.97% and 29.07% in the alkaline solution (pH=10) respectively. Also the removal percentage of cadmium increased when polyaniline /poly(ethylene glycol) composite used as adsorbent. Cation exchangers such as amberjet and purolit removed the cadmium from the solution almost perfectly.*

**Keywords:** Polypyrrole, Polyaniline, Composites, Cadmium Removal, Aqueous Solution



## Process Life Cycle and its Application in Environmental Impact Assessment of Petrochemical Industries

E. Fatehifar\*, M. Abdollahifar

Environmental Engineering Research Center, Faculty of Chemical Engineering,  
Sahand University of Technology, Tabriz, Iran

E-mail: fatehifar@sut.ac.ir

### Abstract

*According to development of environmental impact assessment of industries and its effects on decision making, it is necessary to precise these assessments and verifications. In this article, after introducing several techniques of assessment, their benefits and weaknesses, environmental impact assessments based on life cycle is applied in a petrochemical sector as a case study. Then, procedure of environmental impact assessment based on life cycle is presented and its application difficulties are discussed. Results show that, this technique has a good capability for environmental impact assessments of petrochemical industries and beside of local consideration, it can be used in environmental impact assessments of petrochemical industries.*

**Keywords:** Environmental Impact Assessment, Process Life Cycle, Assessment Feature, Petrochemical Industries

# Modelling of Reactions in Fluidized BED Catalytic Cracking in gasoline Production

M. R. Jafari Nasr<sup>1\*</sup>, I. Eghbal Hamed<sup>2</sup>

1. Research Institute of Petroleum Industry, Tehran, Iran

2. Faculty of Chemical Engineering, Azad University, North Tehran Campus, Tehran, Iran

Email : nasrmrj@ripi.ir

## Abstract

In this paper a simple model is proposed to estimate the gasoline, gas and coke variation respect to residence time and height of a riser reactor in fluid catalytic cracking (FCC) reactions. Cracking reaction zone is simulated by the four-lump kinetic model. The model requires only experimental information for product yields which can be correlated using a proposed third-order polynomial. Combined cracking and decay constants required 4-lump kinetic model which can be obtained from the literature. The differential equations for kinetic model were solved using MATLAB software in order to evaluate FCC product yield-conversion relationships. The method presented in this paper gives accurate predictions of product yields in FCC process with an average deviations less than 3% respect to the given experimental data. A simulation is performed to investigate the effect of changing process variables such as gas oil feed rate, COR, pressure, temperature, height of riser, diameter of riser and so on. Moreover in this paper a simplified procedure to extend 4-lump kinetic model to 5-lump kinetic model is introduced. By this procedure the predicted product yields show a good agreement with the available experimental data.

**Keywords:** Reaction Model, Fluidized Bed, Riser Reactor, FCC Unit, Catalytic Cracking



# University-Industry Relations Challenges and Solutions

M. Haghshenas Fard<sup>1\*</sup>, M. Zivdar<sup>2</sup>

1. Chemical Engineering Department, Isfahan University of Technology, Isfahan, Iran

2. Chemical Engineering Department, Sistan and Baluchestan University, Zahedan, Iran

Email: Haghshenas@cc.iut.ac.ir

## Abstract

Advances technologies are the national necessity for every country and the technology generated from the research and scientific knowledge can be used in the industry. Hence relation and collaboration between the university and industry can beget the suitable path to access the national development and advanced technology. Unfortunately the partnership between the universities and industries in the third world and less developed countries such as Iran is inactive and weak. In this paper after introduction of university-industry relations, reasons of this weak relation are discussed and some procedures for the augmentation of this relation will be presented.

**Keywords:** University, Industry, Relation, Advanced Technology

## Steady State Simulation and Optimization of DME Synthesis in Fixed-Bed Reactor

M. Farsi, A. Jahanmiri\*, R. Eslamloueyan

Chemical and Petroleum Engineering School, Shiraz University, Shiraz, Iran

E-mail: Jahanmir@shirazu.ac.ir

### Abstract

*Dimethyl ether as a green fuel, has received growing attention due to environment pollution and energy supply problem. In this paper, DME synthesis from methanol dehydration is modeled at steady state condition. The process consists of an adiabatic fixed-bed reactor that coupled with a heat exchanger to the preheating of feed stream using outlet product from reactor. The reactor is modeled heterogeneously based on mass and energy conservation laws as well as auxiliary equations. The accuracy of proposed model is improved with comparison between simulation results and plant data. Also, DME production is maximized using manipulation of feed temperature and optimal temperature of feed is obtained.*

**Keywords:** Fixed Bed Reactor, Steady State Simulation, Heterogeneous Model, Process Optimization



## The Use of in-Situ Polymerization for Synthesis of Elastomeric Nanocomposites and Properties of Obtained Nanocomposites

M. abbasian\*, M. Jaymand

Chemistry Research Laboratory, Payam Noor University, Tabriz, Iran

Email: m\_abbasian@pnu.ac.ir

### Abstract

*Rubber / Clay nanocomposites have been extensively studied in recent years. These nanocomposites show many desirable properties such as improved mechanical properties, thermal stability and flame retardation. For compatibility of polymeric matrix/clay and well-dispersion of clay in polymeric matrix, clay must be modified. Alkyl ammonium salt is a customary modifier for clay. Increasing the number and lengths of alkyl chains in quaternary ammonium salt, can cause well-modification of clay. Studies show that the addition of clay not changes the kinetics of polymerization when its content is lower than 3 wt%. Temperature of polymerization and solvent are effective in the dispersion of clay in polymeric matrix. Presence of clay in polymeric matrix affected the values of  $\bar{M}_n$ ,  $\bar{M}_w$  and  $\bar{M}_w / \bar{M}_n$  nanocomposites.*

**Keywords:** Rubber, Clay, in Situ Polymerization, Polymeric Nanocomposites, Modification

# A Short Review on the Synthesis of Highly Open Cell PolyHIPEs: Influence of Effective Parameters on the Foam Structure and Morphology

Z. Abbasian, M. R. Moghbeli\*

Chemical Engineering School, Iran University of Science and Technology (IUST), Tehran, Iran

E-mail: mr\_moghbeli@iust.ac.ir

## Abstract

Highly open porous polymers have been prepared by emulsion polymerization of a continuous phase of high internal phase emulsions (HIPEs). A high internal phase emulsion is an emulsion in which the internal phase, i.e. water or oil, occupies at least more than 74% of the emulsion total volume ( $\phi=74\%$ ). Altering the HIPE stability can control the mean droplet diameter or void size of porous polymers in the range of 1-100  $\mu\text{m}$ . PolyHIPEs have been used for many applications, such as preparation of catalyst supports, absorbents, membranes, and scaffolds used in tissue engineering varying the types and amounts of ingredients in the prepared emulsions. The kind of monomer, cross-linker, surfactant, and solvent in the organic phase of concentrated emulsions influences considerably the structure and properties of the polyHIPE porous materials. For instance, the porous surface area increases significantly on replacing a part of continuous oil phase with a solvent because of the phase separation occurred between polymer and solvent during polymerization. In this paper the influence of effective parameters, such as the type and concentration of the surfactant, monomer, solvent, and electrolyte on the cellular structure of PolyHIPEs has been studied.

**Keywords:** PolyHIPE, High Internal Phase Emulsions (HIPEs), Morphology, Scaffold, Emulsion Polymerization