# Study the Effect of Polymer Concentration on Oil Recovery in Sand Pack

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## Abstract

*In recent years, utilizing EOR methods in order to increase oil recovery from reservoirs is of great importance. One of these methods is polymer injection which may be even used separately for EOR or with other EOR methods to control injection profile. In this paper, injection of low concentration polyacrylamide in concentrations of 100, 300 and 500 ppm studied. In all cases, test temperature was 60℃ and the polymer solution was prepared using distilled water. Polymer injected after water flooding as tertiary recovery when water cut reaches 80%. A polymer slug of 0.3 PV injected in the sandpack and then injection of water is resumed till no more oil recovered.. Results shows that incremental recovery is 15 to 26% more than waterflooding.*

**Keywords:** **Enhanced Oil Recovery, Polymer Injection, Polyacryl Amide, Sandpack**

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# Production of Hydrogen and Carbon Nanofilaments by Catalytic Decomposition of Methane

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## Abstract

*Methane catalytic decomposition is an alternative method than conventional hydrogen production processes such as methane steam reforming, because this method almost emits no green-house gases. In addition, carbon deposited usually as useful nano-filaments are produced in this process. In this paper methane catalytic decomposition is introduced and difficulties of operating in industrial scale are presented. The main drawback of dealing with this process is fast deactivation of catalyst owing to carbon agglomeration on the surface of catalysts. So, the main part of researches are dedicated to solve this problem by developing high activity and stability catalysts, and providing appropriate reaction condition to prolong catalyst lifetime. In this regard, the paper also presents a summary of most important obtained results to make a frame for choosing appropriate amount of factors that influence the reaction yield.*

**Keywords:** **Methane Catalytic Decomposition, Hydrogen Production, Carbon Nano-filaments**

# Thermodynamic Equilibrium Modeling of Tri-Reforming of Methane

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## Abstract

*Tri-Reforming, comprises of steam and $CO_2$ reforming as well as partial oxidation of methane, has became attractive by many researchers for production of suitable $H_2/CO$ ratios, which can be employed in chemical industries for utilization of abounded natural gas. In this research, thermodynamic equilibrium modeling of involved chemical reactions in Tri-reforming of methane has been conducted using CHEMKIN software via Gibbs free energy minimization method. For this work, various mixtures of initial feed (methane, $CO_2$, $H_2O$ and $O_2$) at different temperatures of 500-1000 K and pressures ranging from 1-50 atm. It is shown that, $CH_4:CO_2:H_2O:O_2$ ratios of 1:0.4:0.2:0.1, 1:0.475:0.475:0.1 and 1:0.2:0.5:0.1 are suitable feed composition at 1000 K in terms of methane/$CO_2$/$H_2O$ conversion. In thermodynamic viewpoint, high pressure is not desirable and production of syngas is decreased.*

**Keywords:** **Tri-Reforming, Methane, Syngas, Thermodynamic Equilibrium, CHEMKIN**

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# Evaluation of Possible Recycling of Used Tires Using Microorganisms

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## Abstract

*In this paper, devulcanization of used tires using microorganisms was investigated in order to remove sulfur from the polymeric network of the vulcanized tires. For this purpose, a kind of used tire powder in three different mesh sizes (16-45, 60-100 and >80) and a kind of reclaimed rubber were examined by different mixed cultures and pure cultures. The microorganisms were four microbial consortia prepared from petroleum polluted sites, two species of Acidothiobacillus ferrooxidans (PTCC 1646 & PTCC 1647), Pseudomonas putida (DSMZ 298) and Rhodococcus Erythropolis IGTS8 (ATCC 53968). After five weeks of contact between tires and microorganisms at 30 ºC and 140 rpm, the amounts of sulfate in the culture media were measured indicating the reduction of sulfur from the tire matrix. The results showed that both species of Acidothiobacillus ferrooxidans were best able to increase the amount of sulfate in the culture medium up to 12%.*

**Keywords:** **Waste Tire, Recycle, Devulcanization, Reclaim, Bioremediation**

# UV Stabilization of Polyolefines: An Overview

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**Abstract**

*Polyolefins are one of the mostly used polymeric materials due to low prices and acceptable properties.But these polymers have low UV resistance and therefore it is highly recommended to stabilize them against UV light. This article reviews the effect of different stabilizers and combinations of them on the UV stability of polyolefines.These stabilizers are divided into four general categories: UV screeners, UV absorbers, excited state quenchers and free radical scavengers. Although the latter leads to an acceptable UV resistance in polyolefines, but to achieve the best results a combination of these stabilizers is used. Researches have recommended a trilogy combination of a HALS, a type of antioxidant and carbon black as the best stabilizing system for polyolefines.*

**Keywords:** **Stabilization, Polyolefines, UV Radiation, UV Stabilizers, Carbon Black**

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# A Review on Application of Molecular Dynamic Simulation Methods in Study the Gas Diffusion Properties Through Polymeric Nanocomposites

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**Abstract**

*Investigation and optimization of polymeric nanocomposite properties including gas diffusion and barrier properties requires characterization study at the molecular level. Experimental methods at this scale are time consuming, expensive and in most cases associated with many experimental errors. Simulation approaches including molecular dynamics simulation (MDS) are very appropriate, fast and low expense alternatives for this purpose to study the properties at nanometric length scale. In this article, the structures of polymer-filled nanocomposites are described at molecular level, and the principles of MDS are introduced. Then, the literature is surveyed in the field of MD simulation of gas diffusion through polymer systems and their barrier properties. The softwares used for the study in this area is also introduced, classified and compared. The trend of the number of published papers during the last decade on this subject are finally described and discussed.*

**Keywords:** **Molecular Dynamics Siulation, Polymeric Nanocomposites, Diffusion, Force Field**

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# Emulsions and its Related Problems in Production Units, Formulation of a Water-kerosene Emulsion Demulsifier

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**Abstract**

*Crude oil generally is blended with water. The water creates many problems and increases the cost of oil production. The produced water must be separated from oil. Water in crude oil exists either as free water which settles out rapidly or in the form of an emulsion. A normal oil field emulsion is a dispersion of water droplets in oil. Emulsions can be difficult to treat and may cause several operational problems in wet-crude handling facilities and gas/oil separating plants. Emulsions can create high-pressure drops in flow lines, lead to an increase in demulsifier use, and sometimes cause trips or upsets in wet-crude handling facilities.*
*In present study a blend of chemicals have been investigated which seems can be effective for Demulsification process and it can be used as a demulsifier. The Demulsification effects of heavy aromatic nafta, isopropanol, xylene, naphthalene, ethylbezene were studied using water-kerosene emulsion. A blend of heavy aromatic nafta, isopropanol, naphthalene, ethylbezene demonstrated a 78% separation of water from a stable water-kerosene emulsion.*

**Keywords:** **Emulsion, Demulsifier, Heavy Aromatic Nafta**

# Ultrasound Assisted Process for Producing Biodiesel from Soybean Oil

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## Abstract

*In this investigation the synthesis of biodiesel from Soybean oil by assistance of low frequency ultrasound waves (24 kHz) was studied. The influence of different parameters on reaction progress was studied and was compared with the traditional method. The results showed that using ultrasonic waves could produce biodiesel with 98% conversion in methanol/oil molar ratio of 6:1 and 0.5 wt. % catalysts in reaction mixture, and 10 minutes reaction time at temperature 25°C. The results showed the significant decrease in reaction time and temperature in compare with traditional method. A continuous system was made by assistance of ultrasonic waves to produce biodiesel with high conversion in a reduced condition of time and temperature in atmospheric pressure. The physical factors, engine performance and exhaust emissions was also studied.*

**Keywords:** **Biodiesel, Transesterification Reaction, Ultrasound**

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# Effect of Inlet Cylindrical Section on Dewatering Hydrocyclone Performance by CFD Simulation

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## Abstract

*In this work, a Colman-Thew hydrocyclone type has been simulated utilizing CFD method. In order to take into account the turbulent and multi-phase flow RSM approach and Eulerian-Eulerian model has been applied, respectively. Moreover, for verification obtained results, a comparison between results and reported experimental data are drawn in term of hydrocyclone separation efficiency and split ratio. These results show 9% and 7% average errors for separation efficiency and split ratio respectively. Furthermore, the results show that by decreasing the length of the cylindrical section of hydrocyclone from h=1.5D to h=0.29D, efficiency and overall efficiency incrase 20% and conic shape instaed of cylindrical section, improves the hydrocyclone performance 10%.*

**Keywords:** **Hydrocyclone, Water, Oil, Cylindrical Section, CFD Simulation**