Review on the Effect of Rheological Properties of the Polymers on Preparation of Hollow Fiber Membranes

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Abstract
In this paper, rheological properties of polymeric solutions are investigated in hollow fiber membranes fabrication, when the solutions are close to newtonian or pseudo plastic fluids. Studies in this field show that for pseudo plastic dope solutions, according to process and solution conditions, shear rate increasing results in obtaining dense membranes with narrow and limited pore size distribution, and so low permeate flux and high rejection percent which shows high selectivities. However, when dope solution follows newtonian behavior, prepared membrane are porous with widespread pore size distribution which have high permeate flux and low rejection percent.

Keywords: **Hollow Fiber Membrane, Rheology, Shear Rate, Porosity, Flux, Rejection Percent**

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Experimental Investigation of the Vegetable Oils Performance on Asphaltene Deposition Control of Two Iranian Crude Oils

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Abstract
Inhibitor treatment is an effective method for asphaltene deposition control in petroleum industries. Asphaltene dispersant test is an appropriate method to select the inhibitor type and inhibition evaluation on deposition phenomenon control. The performance of some vegetable oils on asphaltene deposition control of two Iranian crude oils is evaluated. The nut and wheat germ oils have excellent results on these crude oils. Results show these compounds in the concentration of 18000 ppm and more of that can perfectly remove of asphaltene precipitation of two crude oil samples.

Keywords: **Asphaltene, Asphaltene Dispersant Test, Vegetable Oils, Deposition, Crude Oil**

Demetallization of Crude Oil with Emphasizing on Biotechnological Strategies

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Abstract

Oil is a mixture of hydrocarbons containing a variety of organic compounds and heavy metals. The presence of vanadium and nickel in crude oil has an adverse effect on the refinery processes and acts as a poison on catalysts used in catalytic cracking, hydrogenation and hydro-desulphurization processes. This leads to a significant decrease in the yield of cracked products. Metals in crude oil increase the production of coke and gases and cause a marked shortening in the catalyst's life. The process involving the oxidation of sulphur dioxide to sulphur trioxide is catalyzed by vanadium in fuel oil combustion, leading to corrosion and formation of acid rain. Among strategies for removing metals from crude oil, chemical processes such as solvent extraction, catalytic and catalytic hydroprocessing have been commonly used because of their effectiveness. These are often expensive and produce secondary pollution in the environment. In recent years, due to advantage of the biological methods rather than other methods, more studies have been carried out regarding to biorefinery. This paper reviews the recent trends about demetallizating of heavy metals from crude oil with insisting on biological methods.

Keywords: Biological Demetallization, Metalloporphyrin, Crude Oil, Nickel, Vanadium

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Lead Biosorption by Yeast-like Morphology of Fungus *Mucor indicus*

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Abstract

Lead as a heavy and strategic metal and it's contamination in environment, has very importance in industries. The biosorption of lead(II) ions onto Mucor indicus biomass from aqueous solution was investigated. The cells were pretreated with 0.2 M NaOH solution in order to increase the biosorption capacity of M. indicus. The effect of solution pH, initial metal concentration, and biomass dosage on biosorption was studied. Optimum value for initial pH of solution was obtained 5.5. Ho and Langmuir equations were applied to kinetic and isotherm analysis on experimental data. The maximum metal uptake value (q_{max}) was found as 12.121±0.002 (mg/g).

Keywords: Biosorption, *Mucor indicus*, Lead, Industrial Wastewater, Biomass

An Overview on the Preparation and Applications of Polyaniline Nanostructures

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Abstract
Intrinsically conducting polymers are the new and important group of polymers with high potential for the application in various industries such as electronic, sensors and anticorrosion coatings. Among all conducting polymers, polyaniline because of its unique properties such as simple synthesis, high environmental stability and simple redox doping/dedoping has been extensively studied. However, polyaniline suffer from poor processability witch causes to some limits in its applications. Preparation of polyaniline nanostructures is a way to overcome the poor processability and also to improve the electrical properties of polyaniline. The aim of this work is to study and review the various polyaniline nanostructures and their preparation methods as well as their promising properties and potential applications in various technological fields.

Keywords: **Polyaniline, Polyaniline Nanostructures, Oxidative Polymerization, Template Synthesis Method, Non-template Synthesis Method, Hard Template Synthesis Method, Soft Template Synthesis Method**

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A Review on Application of Fourier Transform Infrared Spectroscopy in Characterizing the Effect of Additives on Portland Cement

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Abstract
Additive-containing cements usually exhibit different hydrating behaviors. These behaviors which are sometimes unexpectable can result in some difficulties in engineering properties of the cement-based materials. It is therefore necessary to use an accurate and fast laboratory technique to characterize the hydrating behaviors of the cement-based materials. In some cementing mixes, it is also necessary to determine the presence of relatively less or high amounts of additives. Fourier transform infrared spectroscopy can simply provide all these capabilities. Using this laboratory technique, one can investigate the effects of clinker and additive materials on the hydrating behavior of the cement.

Keywords: **Fourier Transform Infrared Spectroscopy, Portland Cement, Hydration**

Recovery of Bischofite from Salt Lake Brine by Solar Evaporation and Organic Solvent Leaching

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Abstract

Bischofite is a hydrous magnesium chloride mineral with formula $MgCl_2.6H_2O$. Specific gravity of bischofite is 1.56 gram per cubic centimeter, and molecular weight of it is 203.31. Magnesium chloride is industrially useful and necessary in some agricultural applications. The aim of this study is recovery of Bischofite from Salt Lake brine. There are various methods for extraction Bischofite such as solar evaporation methods and ion exchange, but in this study has been used a new and innovative method for extraction Bischofite. This method is combined method of solar evaporation and leaching with organic solvents. The raw material was provided from Salt Lake brine in around Kashan. The impurities in brine were sodium chloride, sulfates and a little calcium chloride and potassium chloride. In this study, with several stages of solar evaporation and leaching was produced Bischofite with purity 99% and recovery 91.69% from brine Salt Lake. Physico-chemical properties of the final product are determined using XRD, complexometry, ICP and gravimetry

Keywords: Bischofite, Brine, Solar Evaporation, Leaching, Organic Solvent

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Simulation Of Desulfation Process in a Fixed-bed Reactor Utilizing CFD Technique

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Abstract

SO_2 Emissions from different industrial activities such as, production of electricity in power plants, the metallurgical and cement productions, to name a few, are undesired due to this chemical's harmful effects. Many processes to reduce sulfur dioxide emissions have been developed. Amongst these processes, direct dry sorbent injection is a relatively simple and low-cost process. In the current study, a CFD investigation of the Direct Sulfation Process is presented. This model accounted for this process to take place in a fixed bed reactor. Effects of important operating conditions including the temperature, concentration and pressure were studied in this work. It was shown that these parameters significantly affected the process. Ultimately, obtained theoretical results were shown to be comparable with experimental data available in the literature. This research provided a complementary theoretical method to the existing experimental technique the former of which might be used for any process optimizations.

Keywords: Computational Fluid Dynamics, Fixed Bed Reactor, Desulfation, Solid-gas Reaction

Fabrication of Metalloporphyrin Containing Magnetic Nanosorbents and its Application for Fluoride Removal from Industrial Wastewater

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Abstract

Although the presence of small amounts of fluoride in drinking water is beneficial for bones and teeth, its excess amounts causes some adverse effects such as dental fluorosis and paralysis; therefore removal of its excess amounts is a must. A lot of industrial activities such as refineries, steel, crystal and glass industries and semiconductor production plants produce high fluoride effluents that should be defluoridized. In this study a new magnetic nanosorbent was produced for the selective removal of fluoride ion from aqueous media; based on parameters such as pH, contact time, amount of sorbent and effect of the present interfering anions in the medium, its performance was studied; under optimal conditions (i.e. pH:5.5, contact time: 40 min and sorbent dosage: 100 mg) the fluoride removal efficiency of 96.2% was achieved. This sorbent could be reused for four cycles. The synthesized sorbent was successfully applied for fluoride removal from the effluents of a crystal and glass production plant.

Keywords: Industrial Wastewater Treatment, Magnetic Nanoparticles, Fluoride Ion