Historical Perspective of SHS Process and its Applications

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Abstract
Solid flame, represents a special pattern of combustion That all of its compounds involved starting, final, and possibly intermediate materials are present in their solid state even at maximum combustion temperatures. The products of solid flame are composed of valuable refractory compounds like as carbides, borides, etc. The focus of conducted researches in this field was on the development of a new production method for Refractory Compounds and Advanced Ceramics, the self-propagating high-temperature synthesis (SHS). It should mention that nowadays By development of sciences and technology, the SHS Process is Conquering the World. Also, in the conducted researches in Japan and Former Soviet Union, This Process was presented as a main branch of Research and Development.
In this article, the Historical Perspective of SHS Process and its applications like as Environmental Protection, will be mentioned.

Keywords: **Solid Flame, Combustion, Self-propagation High-temperature Synthesis, Ceramic, Environment**

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Olfactory Analysis of Palm Olein and Cottonseed Oils and their Various Mixtures

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Abstract
The objective of this research is to investigate the olfactory characteristics of the two selected oils and their various bends using a metal oxide sensor-based instrument (electronic-nose) for headspace analysis. The instrument was also employed to identify the percentages of the above-mentioned oils in unknown samples. The electronic-nose was therefore employed successfully for quantitative analysis of the concerned oil blends (i.e. for determination of unknown blend composition). The Chemometric methodology used for data processing and identification was Statistical Quality Control (SQC).

Keywords: **Palm Olein, Cottonseed Oil, Olfactory Analysis, Metal Oxide Sensor, and Electronic Nose**

Application of Single Wall Carbon Nanotube for Synthesis of Glucose Biosensor

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Abstract
In this paper, the carbon nanotube was applied to prepare an appropriate bed for immobilization of Glucose Oxidase enzyme. The more operational advantages of glucose oxidize enzyme matrix include: efficiency and more accurate control over enzyme reaction, protection against destruction and waste of enzymes, application of enzyme matrix with high efficiency and control of enzymic reaction. For immobilization and stabilization of enzyme on the bed, the ready matrix was washed by sulfuric acid, nitric acid and enough ionized water. The matrix surface, for restrain distort enzyme, was covered by Sistamine. The glucose oxidize enzyme was connected on the matrix by intermediate material; one side of intermediate material is amid group and another side is pyren group. For elimination of impurity, the ready matrix was put into Dimethylformamide (DMF) for several hours. The activity parameter of enzyme was measured by Spectrophotometer in the 460 nm wave length; the immobilized enzyme was could stable for long time. This matrix can use as electrode in sensors structure.

Keywords: **Single Wall Carbon Nanotube, Glucose Oxidize Enzyme, Chemical Vapor Deposition, Biosensor**

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Mechanistic Studies of Forced Gravity Drainage Using Dimensionless Groups

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Abstract
A number of forced gravity drainage experiments have been conducted using a wide range of the physical and operational parameters, where the type, length and permeability of the porous medium as well as oil viscosity and injection rate were varied. Results indicate that an increase in Bond number has a positive effect on oil recovery whereas capillary number has an opposite effect. Furthermore, it was found that use of each number alone is insufficient to obtain a satisfactory correlation with recovery. A combined dimensionless group is proposed that combines the effect of all three forces. The exponent of the Bond number in the proposed group is larger than the capillary number suggesting a larger importance for the former. We then show that the same group provides a good correlation for recovery from addition experiments conducted in this work and another set of experiments in the literature.

Keywords: **Forced Gravity Drainage, Dimensionless Groups, Capillary Number, Bond Number, Combined Dimensionless Number, Enhanced Oil Recovery, Gas Injection**

Simulation and Study of Olefin Process Based on Ethane

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Abstract
Olefin compounds are considered as the most important unsaturated hydrocarbons. They play a key role in different industries. Steam cracking of saturated hydrocarbons is one of the most important methods for production of these compounds. Economical and operational optimization in the olefin plants because of their complexity is very important. Using simulation software provides us the possibility of these studies. In this work utilizing HYSYS simulation software an olefin plant based on Linde technology has been simulated and the operational parameters in steam cracking have been studied. The results have been compared with process flow diagram data. It has been shown that the software results have minimum error.

Keywords: Olefin, Ethylene, Cracking, Simulation, HYSYS Software

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Study and Comparison of Performance of Zeolite and Zeotype Molecular Sieves in Conversion of Methanol to Olefin

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Abstract
Conversion of methanol to olefins (MTO) process is one of the most interesting processes for converting natural gas to chemical products. Molecular sieves are the conventional catalysts for this process. In this paper, the selectivity of three groups of molecular sieves, including small, medium and large pore opening, relative to light olefins has been studied for the purpose of improvement of the light olefin products in MTO reaction. Small pore opening molecular sieves in comparison with large and medium pore opening molecular sieves showed higher selectivity to light olefin, although formation of branched isomers and aromatics in its pores caused fast deactivation of the catalyst. Evaluation of these groups of molecular sieves for conversion of methanol to light olefins showed that small pore size molecular sieves, particularly SAPO-34, exhibited the best performance based on the selectivity to C_2–C_4 olefins and minimum production of paraffinic and aromatic byproducts. Because of its appropriate size and acidity, SAPO-34 molecular sieve reveals a very high selectivity to light olefins. However formation of aromatic compounds inside the small pores of this catalyst may lead to its faster deactivation.

Keywords: Methanol to Olefin, Molecular Sieves, SAPO-34, ZSM-5

Analysis on the Effects of Nano-Aluminium on Rocket Propellants

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Abstract

The application of Aluminum nanoparticles for rocket solid propellants similar to Aluminum microparticles has advantages and disadvantages. Rocket solid propellants for space applications are composite materials, constituted by the major part of an oxidation agent (an inorganic salt as ammonium perchlorate AP); a metallic filler being a good fuel (aluminum powder) and an organic binder (typically a polymeric matrix as hydroxyl-terminated polybutadiene HTPB). In the present study, the characterization of Al nanopowder, their effects on rocket solid propellants performance and combustion formulation evaluated using SEM and BET methods. Also some series of propellant that contains different formulation were studied, in order to evaluate the effects of using nanoparticles instead of microparticles, non-homogeny of Al dispersion and the effect of residence time on stable combustion velocity. The results of investigation indicated that the stable combustion velocity increased by decreasing Al particles size and using newer nanoparticles instead of older one.

Keywords: **Rocket Solid Propellants, Specific Area, Aluminum Nanoparticles, Stable Combustion Velocity, Electron Microscopy**

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Determination of Operational Parameters Effect on the Particles Characteristics in Nano Particles Formation Through RESOLV Method

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Abstract

At the present work, we used the RESOLV (rapid expansion of supercritical solution in to the liquid solvent) method in order to drug nano-particles formation with high solubility rate. This method is specially recommended for producing the biologics, drugs and food material nano-particles because of the middle operational condition. Spraying the supercritical solution into a high dense environment causes fine and uniform paricels formation. Investigation of the jet receiver liquid conditions effects on the formed particles physical properties, is the main goal at this study. Results showed that if the receiver liquid temperature adjusted at below 10°C, non-uniform and crystalline particles whitouth any considerable solubility rate achivment. Apart from the loquid temperature, using a polymeric solution as the receiving liquid affects on the particles properties. The model component at this work is iIbuprofen that is a anti-inflammatory and analgestic drug that always used orally. Decreasing the particles size causes increasing mean particle area and solubility consequently. CO2 which is a reasonable, available, non-flameable and non-toxic gas, with middle supercritical point condition (72 bar and 31/1°C) was used as the supercritical fluid.

Keywords: **Rapid Expansion, Spray Jet, Supercritical Carbon Dioxide, Drug Nano Particles, Polymeric Solution**

Porous Glass Ceramics and Methods for Fabricating Nano-sized Pores

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Abstract

Nanoporous materials have developed in recent decade. Nanoporous glass ceramics had great role in this development. They found interesting applications in biology, immobilization of enzymes, gas catalysts & etc. In this report, porous glass ceramics and their classification are introduced briefly; Then three methods for fabricating nano-sized pores using "Combination with organic materials and burnout of them in high temperature", "Acid soluble crystalline phases making & leaching" & "Lithography-leaching"are introduced and studied. Finally, porosity size control in glass ceramics is discussed.

Keywords: Glass Ceramics, Nanoporous, Leaching