

# Extraction and Purification of Saffron Bioactive Components

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## Abstract

*Saffron is the world's most expensive spice and due to its bioactive components including crocin, picrocrocin and safranal have numerous nutritional properties and unique organoleptic features. Therefore, extraction and purification of these components is of great importance for use in food and drug industries. Various methods including soaking, steam distillation, ultrasound, supercritical fluid, solid phase extraction and crystallization is evaluated in this way. Each of these methods have certain advantages and disadvantages. For saffron component purification purpose, usually a combination of two extraction methods is used. Extraction of saffron extract through soaking method followed by injection the obtained extract into a column containing solid-phase is a way to purify the active ingredients. In this study, various methods of extraction and purification of saffron bioactive components is evaluated.*

**Keywords:** Saffron, Crocin, Picrocrocin, Safranal, Extraction, Purification.



# A Review on Leak Detection Methods from Natural Gas Facilities and Pipelines

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## Abstract

*In addition to the environmental, safety and economic consequences, leakage from gas pipelines can lead to a dramatic increase in the greenhouse effect. To avoid and reduce the consequences of the gas leakage, different methods have been developed based on the detection mechanisms. Considering the needs, these methods are able to detect, locate and measurement of the amount of gas leakage. Two main categories of methods are technical and non-technical. Typically technical methods have a detector or sensor that makes a change in system when being in contact with the gas. In this paper, firstly, leakage detection and classification methods are introduced. Then they have been compared based on certain criteria which will be discussed.*

**Keywords:** Gas Leakage, Leak Detection, Leakage Locating, Gas Pipelines, Methane Sensor.

# An Extensive Review On Spent Caustic Treatment Methods In Oil And Gas Industry

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## Abstract

Spent caustic is considered to be one of the liquid industrial wastes that are not easy to handle and to dispose of, due to its high content of pollutants, alkalinity ( $PH > 12$ ), high salinity (sodium of 5-12 wt%) and high sulfide concentration (2-3 wt%). The composition of spent caustic streams is highly variable and can be categorised into three groups, depending on origin and composition in the groups of sulphidic, cresylic and naphthenic. There are some methods for treatment of spent caustic including following list: 1. Neutralization with sulfuric acid 2. Injection in deep wells 3. Coagulation and flocculation 4. Wet air oxidation 5. Catalytic oxidation 6. Advanced oxidation 7. Biological method 8. physical method. Due to the presence loads of organic, inorganic and suspended compounds in a spent caustic, TDS and COD amounts of these compounds is high, COD value range is on limit of 2000-60000ppm and TDS value range is on limit of 100000-200000 and getting COD and TDS value to accepted level of environmental regulation different treatment methods shall be applied. Characteristics of spent caustic will be identified required process for treatment.

**Keywords:** Treatment, Spent Caustic, Catalytic Oxidation, Advanced Oxidation, Coagulation, Biological Treatment, Neutralization.



# A Review on Electrospun Polymeric Nanofibers and Antibacterial Wound Dressing

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## Abstract

Wound healing is important in medicine so that the development in this area can affect a major impact on quality of patient life. Using suitable dressing is one of the effective role in wound healing. In recent years, new generation of wound dressing with different formats like sponge, film, hydrocolloid, and so on are developed. However, fewer dressing has complete requirement of wound healing. Recently, electrospun polymeric nanofibers is widely considered due to their unique properties in wound dressing and healing. Electrospinning has been widely used as a nanofiber fabrication technique. Polymeric nanofibers with different morphologies and dimensions can be obtained from electrospinning method. These nanofibers show high surface area to volume ratio, tunable porosity and facile surface functionalization. These characterization lead to different application especially in medicine. This report gives us an overview of some recent advances of electrospinning, fabrication of polymeric nanofibers and their application in wound healing. First, we briefly discuss the wound healing process then the electrospinning process and fabrication of electrospun nanofibers are investigated. Finally, nanofibers in combination with others nanomaterials and their application in wound dressing and antibacterial properties are studied.

**Keywords:** Wound Dressing, Antibacterial Properties, Nanofiber, Electrospinning, Nanoparticle.

# Investigation of Carbon Supported Catalysts for Hydrogen Generation by Hydrolysis of Sodium Borohydride

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## Abstract

Hydrogen fuel cell emerges as a replacement for combustion engines due to the lack of any contaminant emission. Hydrolysis of hydrated solids in the presence of an appropriate catalyst can be an efficient method for hydrogen generation. Among these materials, sodium borohydride is in the focus of researches attention due to its relatively low cost, high hydrogen yield, and availability. Various heterogeneous catalysts along with noble and transition metals supported on different materials including zeolite, alumina and activated carbon were synthesized by wet impregnation for hydrogen generation. The main purpose of this work is the complete study on catalysts supported on carbon for hydrolysis of sodium borohydride due to the simple production from invaluable raw materials, high mechanical resistance and hydrophobic property. Experimental pilot for hydrogen generation and the effect of operating conditions including reaction temperature, concentration of sodium borohydride, and catalyst dosage is also studied in this present work.

**Keywords:** Sodium Borohydride, Hydrogen, Activated Carbon, Catalyst- Impregnation.



# A Review of Approaches for the Modelling and Optimization of Catalytic Cracking Processes

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## Abstract

Naphtha catalytic reforming process is one of the most critical operations in petroleum refineries to produce gasoline with high octane number and valuable aromatics. This study by examining a wide range of publications since 1959 focuses on three topics kinetic modeling, steady and unsteady modeling and optimization. Most kinetic models were based on lump method 3 to 31 lumps and molecular modeling is rarely used due to the complexity and high volume of computations. In steady and unsteady modeling, the phenomenon of penetration in the process is neglected. Among the different configurations of the reactors, it was observed that the spherical radial flow reactors which were examined on a pilot scale have a lower pressure drop in their bed. The optimization of the reactors is often based on the steady mode and the reactor input temperature, pressure and catalyst mass distribution parameters have been optimized. It was also observed that if the first reactor operates at the highest possible temperature and the other reactors at a lower temperature the economic performance of the process will be improved.

**Keywords:** Catalytic Reforming, Modeling, Kinetic Modeling, Dynamic Modeling, Optimization, Reactor.

# The Study of Effective Parameters on Burning Rate of Ammonium Perchlorate/ Aluminum/ Hydroxyl Terminated Polybutadiene (AP/ Al/ HTPB) Based Composite Solid Propellants

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## Abstract

*Performance properties of propellant such as burning and specific impulse have a great influence on the ballistic successful of the solid rocket motors. The performance properties are directly related to the combustion process. The affecting factors on the combustion process and burning rate depends on the formulation parameters (chemical nature, amount, size and distribution of raw material particles, etc.) and external factors (effects of sound waves, mixing conditions, casting, etc.). In this paper, the effects of different components of composite solid propellants formulation based on Ammonium Perchlorate/Aluminum/ Hydroxyl Terminated Polybutadiene (AP/Al/HTPB) such as oxidizer, metal fuel, binder, and additives on combustion process in the microscopic scale were investigated. The affecting factors on the burning rate and their mechanism of influence were analyzed.*

**Keywords:** Composite Solid Propellants, Combustion, Burning Rate, Aluminum Powder, Ammonium Perchlorate, HTPB.