



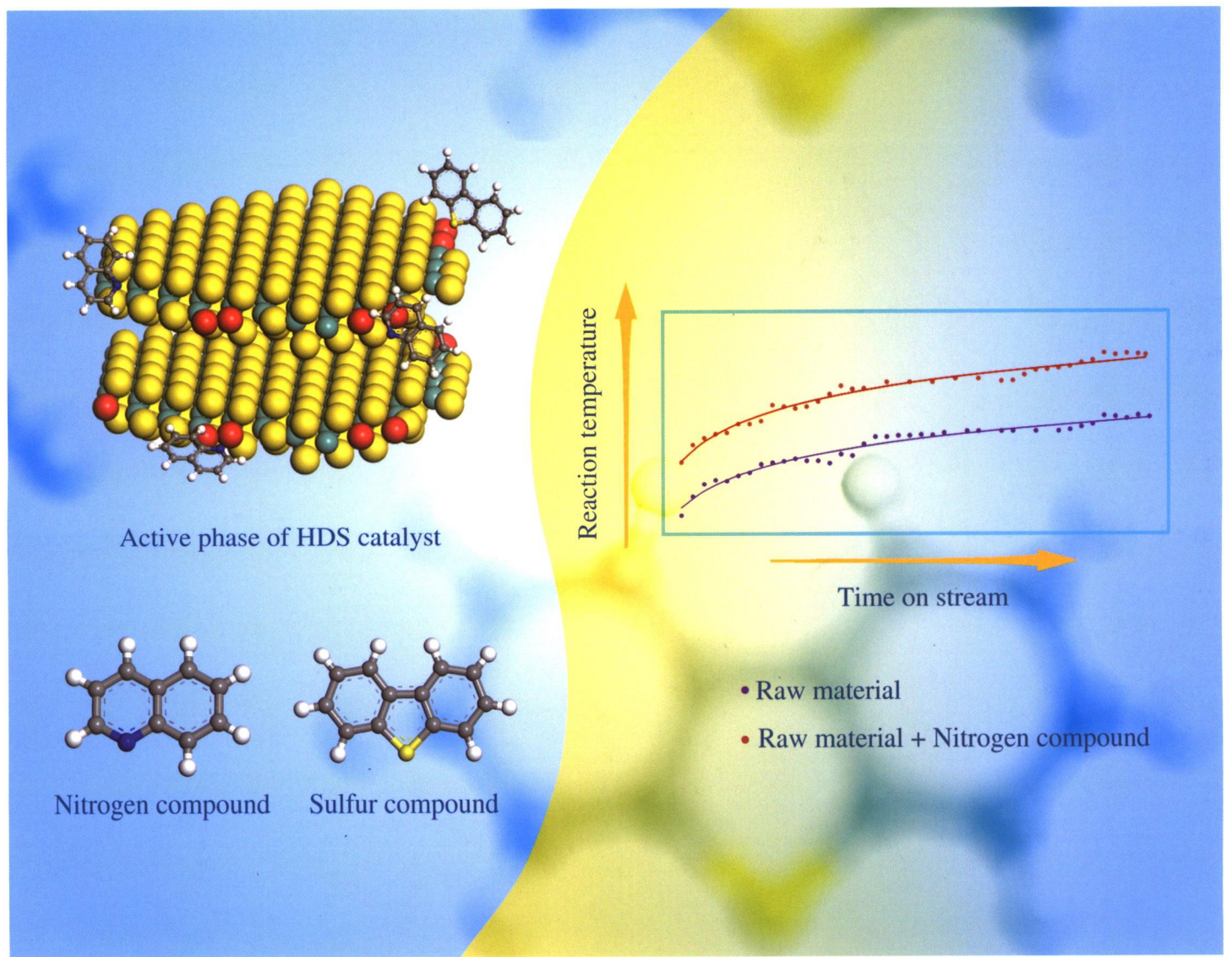
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ACTA PETROLEI SINICA (PETROLEUM PROCESSING SECTION)

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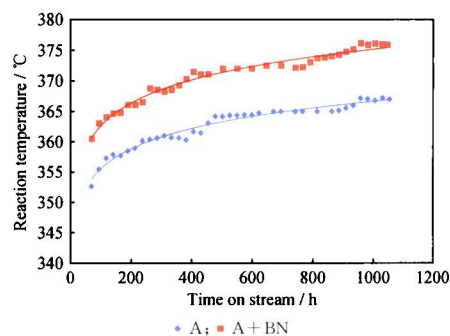
Special Articles

Acta Petrolei Sinica (Petroleum Processing Section), 2019, 35(1): 0001-0010 doi: 10.3969/j.issn.1001-8719.2019.01.001

Effect of Nitrogen Compounds on the Running Stability of Ultra-Deep Hydro-desulfurization Diesel Catalyst

GE Panzhu DING Shi ZHANG Le LI Dadong NIE Hong

Effect of nitrogen compounds on the running stability of ultra-deep hydro-desulfurization diesel catalyst was studied in a pilot plant. Experimental results that nitrogen compounds mainly impacted on catalyst initial activity, and led to initial reaction suggested temperature 7–10 °C higher. However, nitrogen compounds have little impact on catalyst stability.

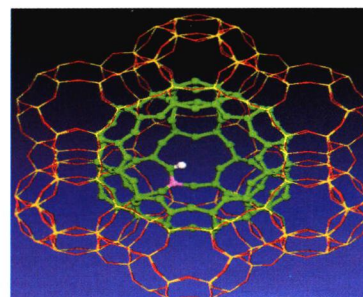


Acta Petrolei Sinica (Petroleum Processing Section), 2019, 35(1): 0011-0019 doi: 10.3969/j.issn.1001-8719.2019.01.002

Distribution of Aluminum Atoms in FAU Structured Framework and Their Influence on Brønsted Acid Strength

DU Yannian ZHOU Xiang ZHOU Han GUO Jinbiao

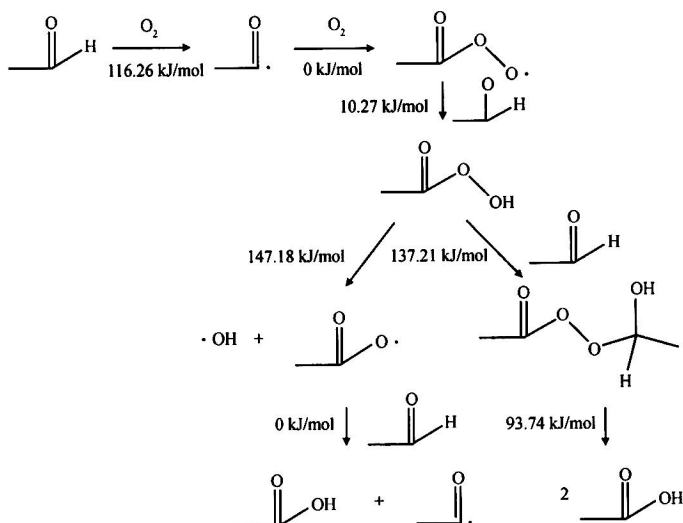
Distribution of Al atom in FAU typed framework varies along with the increasing of the number of Al atom. At the same time, as the rising of Al atom number in sodalite cage, Brønsted acid strength is nonlinearly decreasing. Electron inducement of NNN-Al atom is stronger than that of NNNN-Al atom, which polarizes the protons attributing to Brønsted acid site and devotes to the amplitude of variation in acid strength.



Molecular Simulation on the Reaction Mechanism of Acetaldehyde Oxidation to Acetic Acid

XIA Lei LONG Jun WU Zhiqiang ZHAO Yi
DAI Zhenyu WANG Lihua

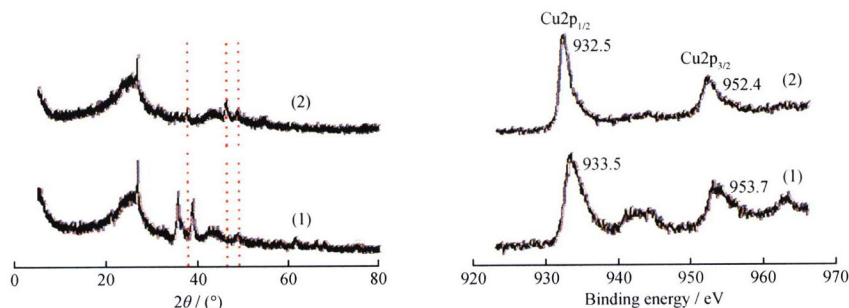
The reaction of acetaldehyde oxidization to acetic acid was investigated by density functional theory (DFT) method. It is found that the reaction of peracetic acid to acetic acid is the rate control step in the overall reaction process. The highest reaction energy barriers of the two possible paths are 147.18 kJ/mol and 137.21 kJ/mol, respectively.



Characterization of Adsorbents for FCC Gasoline Dearsenification and Related Mechanism

LIU Kunhong JU Yana LAN Ling WANG Fei FENG Qi CAO Qing GE Shaohui XIAO Zhanmin ZHOU Jisheng

After dearsenification, the size of the active components CuO particle becomes increased significantly, with the average particle size increasing to 30 nm. The lattice fringes of CuO disappear after dearsenification, indicating that the transformation of crystalline CuO to amorphous material.

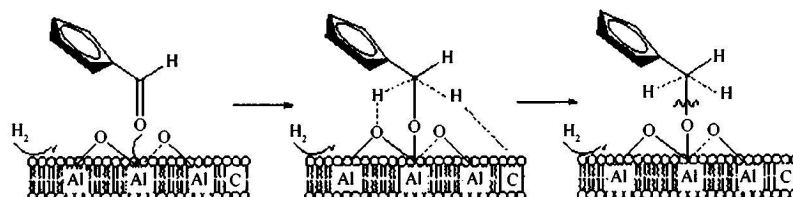


(1) Before dearsenification; (2) After dearsenification

Characterization of Ni₂P/rGO-Al₂O₃ Catalyst and Its Catalytic Performance in Hydrodeoxygenation

XU Haisheng WANG Hao HE Lijuan

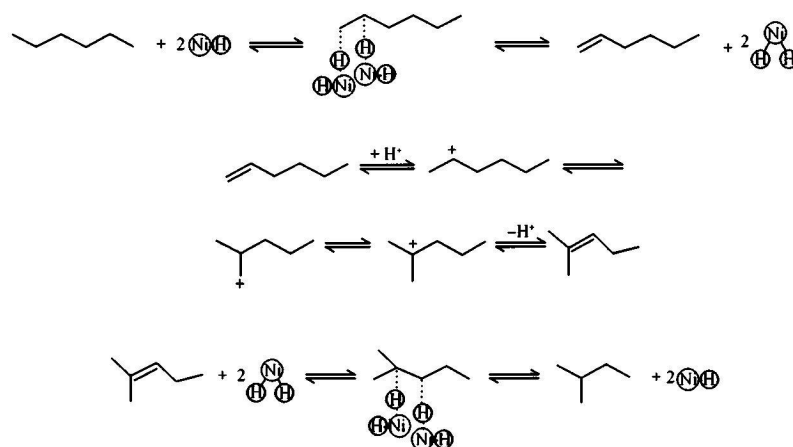
The lone electron pair of carbonyl oxygen atoms of benzaldehyde interacts with the Lewis acid centers provided by the rGO-Al₂O₃ composite carrier, which weakens C=O bonds and activates the benzaldehyde molecules. Meanwhile, the excellent hydrogen storage performance of rGO provides enough hydrogen species in the hydrogenation reaction.



Preparation of NiH/H β Catalyst and Its Catalytic Activity in *n*-Hexane Isomerization

XIA Daohong CHEN Jinshe CAI Tingting ZHU Lijun JIANG Shengjuan DUAN Zunbin YANG Lingbin

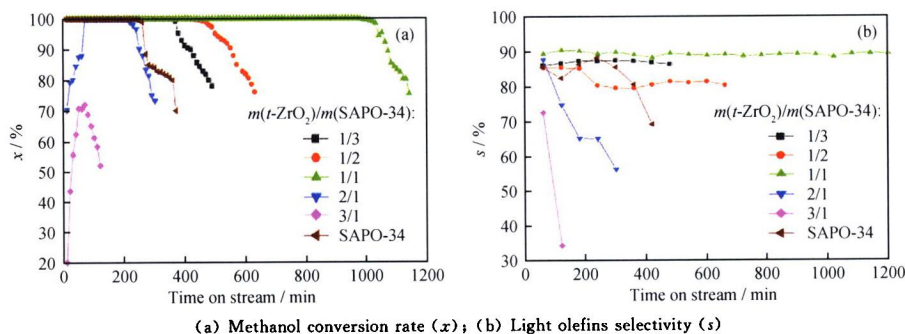
A novel NiH/H β catalyst for *n*-alkanes isomerization was prepared by impregnation method. The catalytic performance of the catalyst in *n*-hexane isomerization was investigated. Based on the above results, the reaction mechanism of *n*-hexane isomerization was proposed, which suggests Ni-H species acting as metal sites have good hydrogenation/dehydrogenation activity.



Effects of $t\text{-ZrO}_2$ /SAPO-34 Mass Ratio on the Physicochemical Properties and Catalytic Performance of $t\text{-ZrO}_2$ /SAPO-34 Composite Materials in Methanol-to-Olefin Reaction

WANG Le LI Xiaotao CAO Jianxin LIU Fei

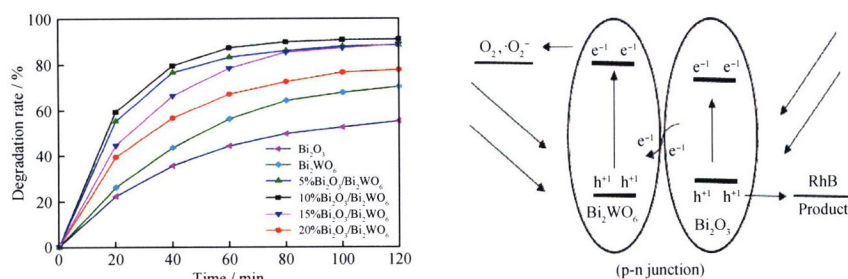
As $t\text{-ZrO}_2$ /SAPO-34 mass ratio of 1/1, the uniformly continuous coating phase and hierarchical structure with large amount of weak acid are successfully obtained in the $t\text{-ZrO}_2$ /SAPO-34 composite catalyst via hydrothermal coating method. Compared with single SAPO-34, the catalytic lifetime of $t\text{-ZrO}_2$ /SAPO-34 is significantly extended by 768 min.



Preparation and Photocatalytic Activity of $\text{Bi}_2\text{O}_3/\text{Bi}_2\text{WO}_6$ Heterojunction Photocatalysts

CHEN Xi WANG Yongqiang LIU Minmin HAN Fenglei WANG Min

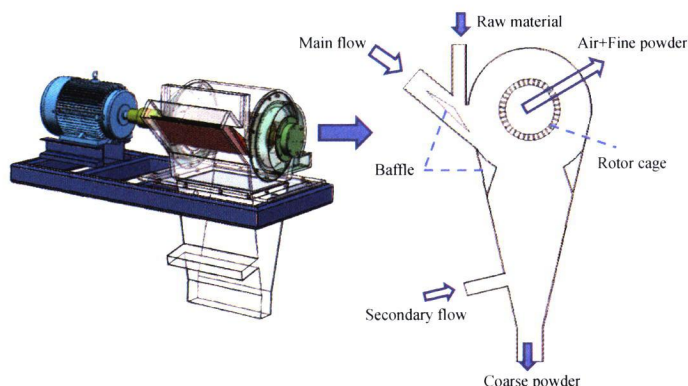
$\text{Bi}_2\text{O}_3/\text{Bi}_2\text{WO}_6$ heterojunction catalysts were prepared by one-step hydrothermal crystallization method. The catalysts are of high catalytic activity and low band gap width. The morphology and structure of the catalyst were investigated by means of various methods, and the plausible reaction mechanism was proposed.



Research on the Classification Performance of a Horizontal Turbo Air Classifier for FCC Catalyst

YANG Ling SUN Zhanpeng YANG Xiaonan
SUN Guogang ZHOU Yan

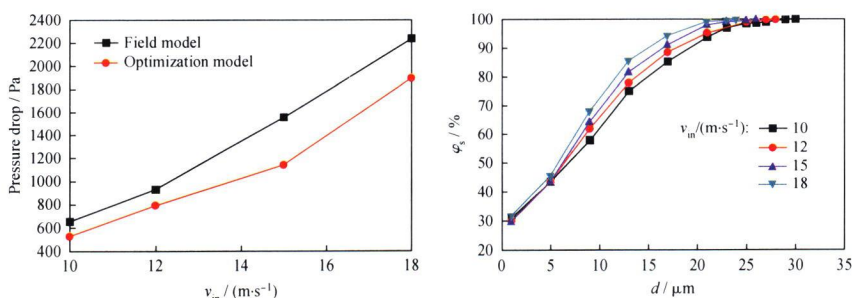
A novel turbo air classifier with a horizontal rotor cage, baffles and two symmetrical air outlets was designed. It can achieve good classification performance with Newton classifying efficiency of 82.4% and classifying accuracy index of 1.54.



Optimization of Fast Separator Structure of FCC Riser Reactor

WU Zhijun LI Qiang WANG Zhenbo XU Jiawei LI Anjun JIN Youhai

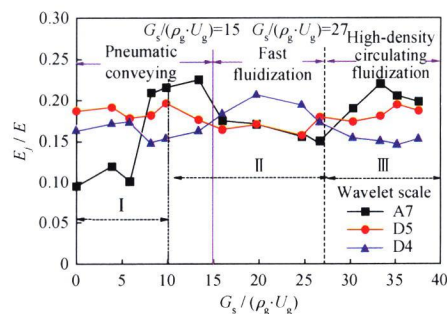
A new fast separator with internal flow guide is proposed for an FCC unit. For the optimized structural design, pressure drop is much lower, and the cyclone separation efficiency is much higher. As inlet velocity increases, separation efficiency improves, but this also leads to a higher pressure drop. Therefore, the determination of inlet gas velocity in operation should consider the above two factors.



Characteristics of Pressure Fluctuation in Adjustable Combined Riser and Flow Regime Transition

XIE Jinpeng WU Guangheng WANG Dewu LIU Yan
ZHANG Shaofeng

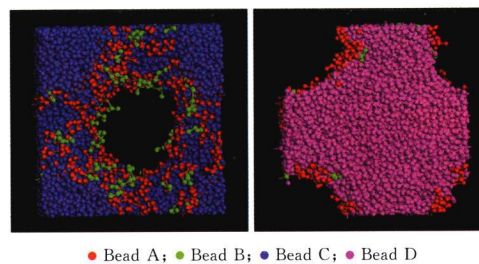
With the raising of solid-gas ratio, there were three flow regimes in the riser, i.e., pneumatic conveying ($G_s/(\rho_g \cdot U_g) 0-15$), fast fluidization ($G_s/(\rho_g \cdot U_g) 15-27$), high-density circulating fluidization ($G_s/(\rho_g \cdot U_g) 27-37.60$).



Mesoscopic Simulation of Surfactant on Oil-Water Interface

HOU Yanbo REN Qiang

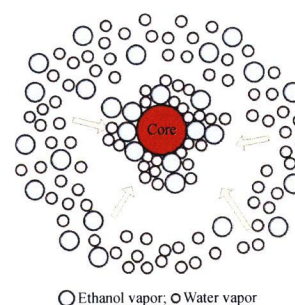
When the oligomeric surfactants are added, oil and water will be aggregated, respectively, and an interfacial layer can be formed between the oil and water. Oligomeric surfactant molecules distribute around the oil-water interface, wherein polar group A beads are close to the water phase, but non-polar group B beads are close to the oil phase.



Numerical Simulation and Experimental Study on Supersonic Condensation Process of Ternary Mixture

CAO Xuewen BIAN Jiang JIN Xuetang YIN Pengbo YANG Wen

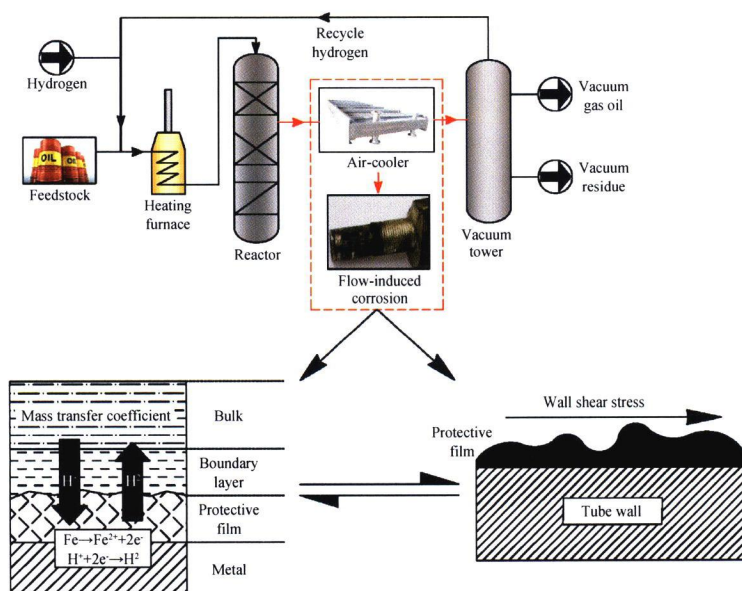
When the condensable components are saturated at the inlet, higher pressure and temperature favor inlet liquid condensation. Compared with binary mixture, the Wilson point of condensation is closer to the throat and the outlet humidity is greater in the ternary mixture.



Numerical Simulation of Flow Parameter Distribution Characteristics in Inlet Pipes of High Pressure Air-Coolers

OU Guofu XU Xiaofeng LÜ Wenchao JIN Haozhe ZHANG Lin

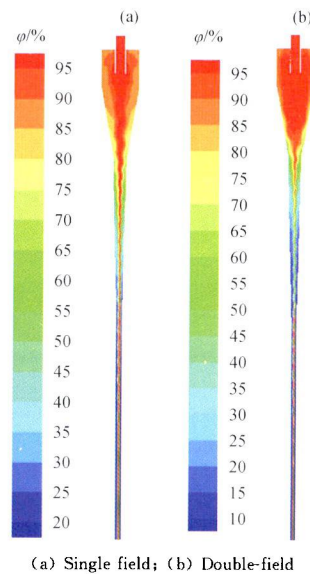
To research the perforating and leaking of the air-cooler tubes caused by flow-induced corrosion in crude oil processing, the interaction between electrochemical corrosion and hydrodynamics is considered. Mass transfer coefficient and wall shear stress are utilized as the key parameters to predict the flow-induced corrosion positions in high pressure air-coolers. Comparing the results with a failure case, the accuracy of characterization method has been verified.



Numerical Analysis on Separation of Emulsified Waste Oil by Electric Field With a Double-Field Coupling Device

GONG Haifeng YU Bao DAI Fei ZHANG Xianming PENG Ye WANG Liming

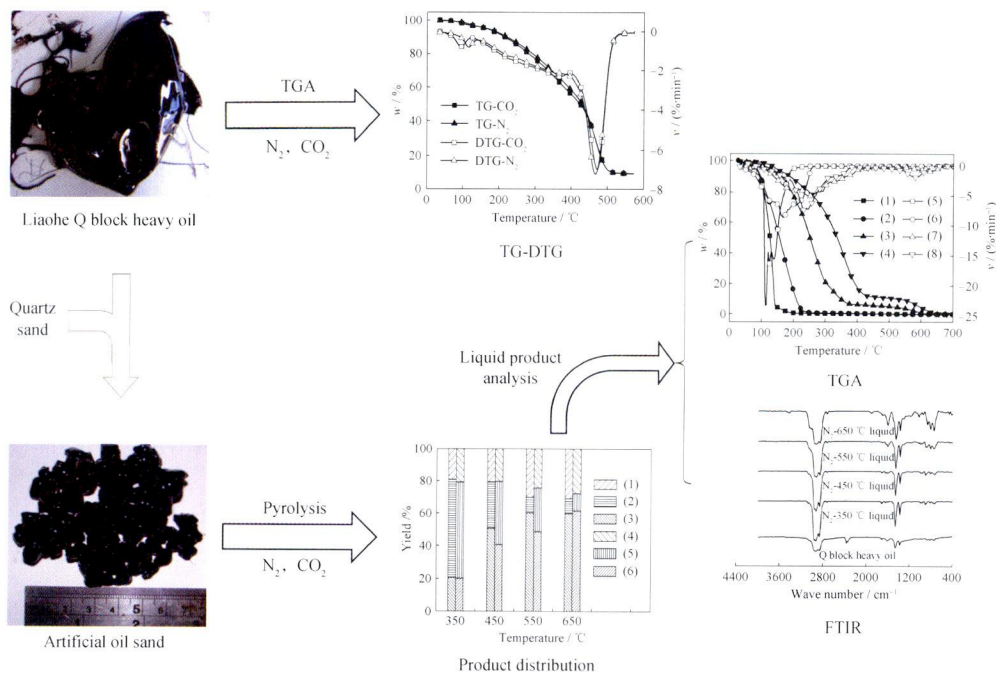
Embedded high voltage electrode in the hydro-cyclone does not have an obvious effect on internal flow field, however, it can improve the water phase separation from the oil-water mixture and improve separation efficiency.



Pyrolysis Process and Product Properties of Liaohe Heavy Oil Under N₂ and CO₂ Atmosphere

HE Yong CHEN Jianbiao HU Changhao LANG Xuemei GONG Yuning WANG Yanhong FAN Shuanshi

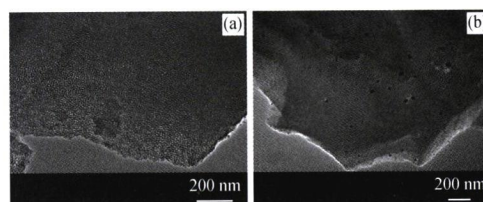
With using thermogravimetric analyzer and a fixed-bed reactor, the effects of N₂ and CO₂ on the heavy oil pyrolysis process, product distribution and properties were studied. The pyrolysis process of heavy oil could be divided into 3 stages, i. e. , water evaporation, weak chemical bond breakage, and heavy components cracking to form light oils and coke.



Adsorption of *p*-Nitrophenol From Aqueous Solution by Mesoporous Carbon and Its Fe-Modified Materials

LI Jiaman DAI Yexin LI Yuwei LIU Fang ZHAO Chaocheng
WANG Yongqiang

The adsorption behavior of *p*-nitrophenol by mesoporous carbon (MC) and its Fe-modified materials (Fe/MC-*x*) in aqueous solution was investigated. The adsorption performance of Fe/MC-*x* is better than MC, and Fe/MC-1.0 has the highest adsorption capacity of 220.35 mg/g under the same experimental conditions.



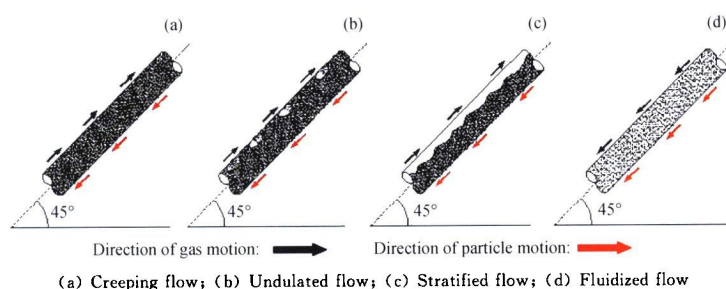
(a) MC; (b) Fe/MC-1.5

Research Notes

Experimental Study on the Relationship Between FCC Catalyst Flow Pattern and Butterfly Valve Open Ratio in the Inclined Pipe

WANG Chuangbo SHI Ruijie MA Ling WANG Naijia YAN Chaoyu WEI Yaodong

With increasing valve open degrees, the relationship between the particle transport flow patterns and the solids mass flux was discussed. The flow patterns in the inclined standpipe are creeping flow, undulated flow, stratified flow and fluidized flow. Flow patterns can be differentiated through the difference of the particle mass flux profiles.

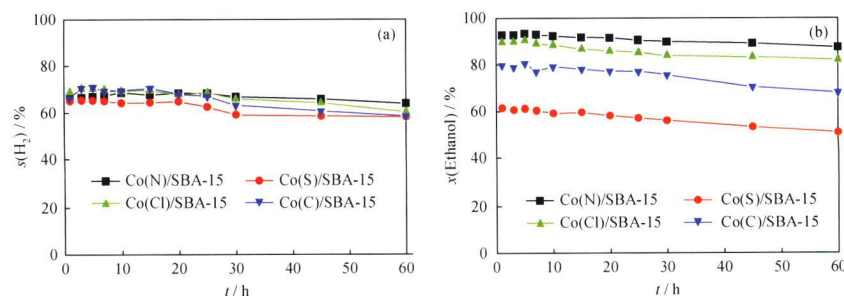


(a) Creeping flow; (b) Undulated flow; (c) Stratified flow; (d) Fluidized flow

Influences of Cobalt Sources on the Catalytic Performance of Co/SBA-15 in Ethanol Steam Reforming Reaction

HAN Zheng LIN Dandan AN Xia XIE Xianmei

Four catalysts were synthesized by impregnation method using SBA-15 as carrier and cobalt dioxide, cobalt acetate, cobalt sulfate and cobalt chloride as cobalt sources, respectively. After calcination, the catalyst prepared with cobalt acetate has carbon deposition, while the catalyst prepared with cobalt sulfate is difficult to be reduced. The catalyst prepared with cobalt nitrate as cobalt source shows the best catalytic efficiency.



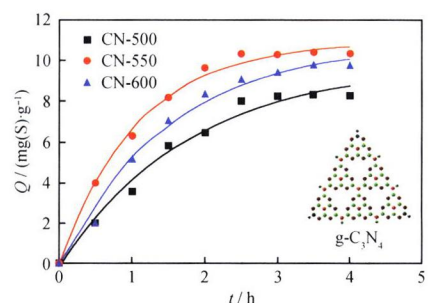
(a) $s(\text{H}_2)$; (b) $x(\text{Ethanol})$

Reaction conditions: $V(\text{H}_2\text{O})/V(\text{CH}_3\text{CH}_2\text{OH})=10$; Reduction temperature of 400 °C; Reaction temperature of 550 °C

Mesoporous $g\text{-C}_3\text{N}_4$ Preparation and Its Application on Jet Fuel Desulfurization

ZHANG Yueyue LIANG Yuanwei HUAN Xianli ZHOU Ning
HE Jianping

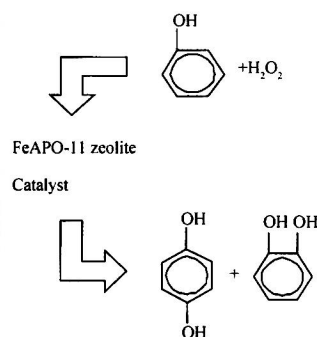
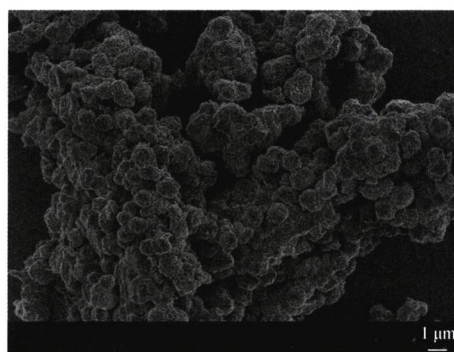
Mesoporous $g\text{-C}_3\text{N}_4$ was prepared by SiO_2 with hard template method at different calcined temperatures. CN-550 (calcined at 550 °C) has the optimal absorption capacity in jet fuel.



Preparation of FeAPO-11 Molecular Sieves via Improved Solvent-Free Method and Their Catalytic Performances

ZHAO Xinhong HAO Zhixin ZHANG Xiaoxiao DUAN Weiting WANG Qingpeng

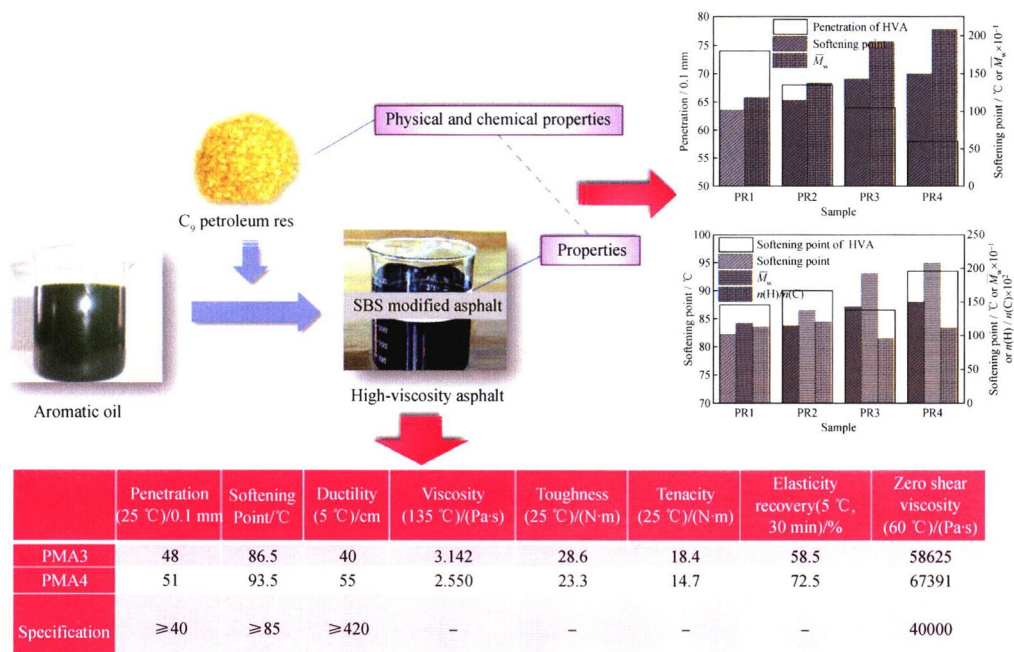
FeAPO-11 zeolites with morphology of spherical nanocrystalline were prepared by introducing various pretreatments, based on the solvent-free method. Their catalytic performances were investigated using phenol hydroxylation as a probe reaction.



Effect of C₉ Petroleum Resins on the Performances of High-Viscosity Asphalt

NIE Xinyao YAO Hongru LI Zheng ZHOU Xiaolong LI Chenglie

C₉ petroleum resin (PR) and aromatic were selected to improve the compatibility between SBS and asphalt when preparing high-viscosity asphalt. The effect of C₉ PR properties on the performances of HVA was studied. This work provides the theory support for optimizing of HVA production process through proper C₉ PR selection.

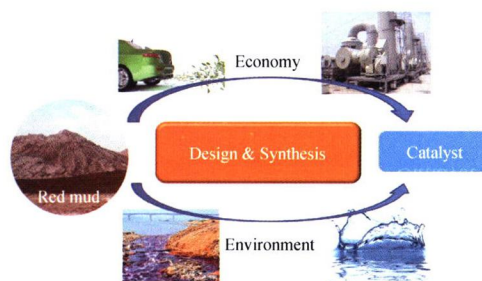


Reviews

Application of Red Mud in Different Catalysis Processes

HU Zhongpan ZHANG Lingfeng YUAN Zhongyong

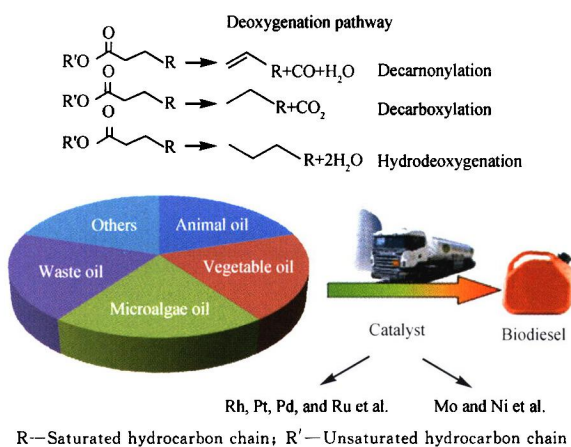
Red mud, a large scale aluminum industry waste, causes serious environmental pollution issues. After a proper treatment, it can be used in many catalytic applications such as hydrogenation, hydrodechlorination, catalytic combustion and hydrogen production due to its iron content in form of ferric oxide, high thermal stability, small particle size, sintering resistance and resistance to poisoning.



Review of Reaction Mechanisms of Lipid Catalytic Hydrodeoxygenation Reactions

MIAO Caixia ZHOU Guilin JIAO Zhaojie ZHANG Xianming

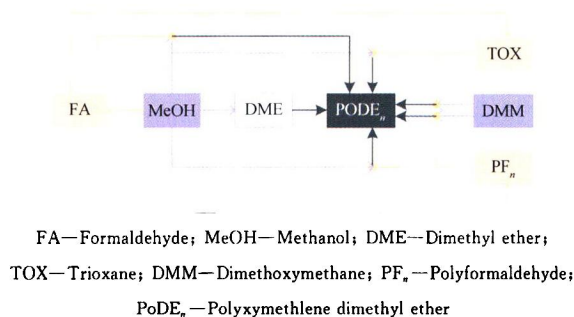
Reaction mechanisms for lipid HDO with noble metal catalysts (i. e. Rh, Pt, Pd, Ru) and transition metal catalysts (i. e. Mo and Ni) are discussed. Effects of metal type, properties of carriers and additives on HDO reaction mechanisms are further explained. Future research directions on reaction mechanisms of lipid catalytic hydrodeoxygenation are also reviewed.



Progress of Reaction Mechanisms and Kinetics of Polyoxymethylene Dimethyl Ethers Synthesis

YAN Ximing WANG Baoyu CHAO Huixia

The progress of reaction mechanisms and kinetics of PODE_n synthesis were reviewed, and the outlook of its future development was also discussed.



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SHIYOU XUEBAO (SHIYOU JIAGONG)

主编 汪燮卿

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