

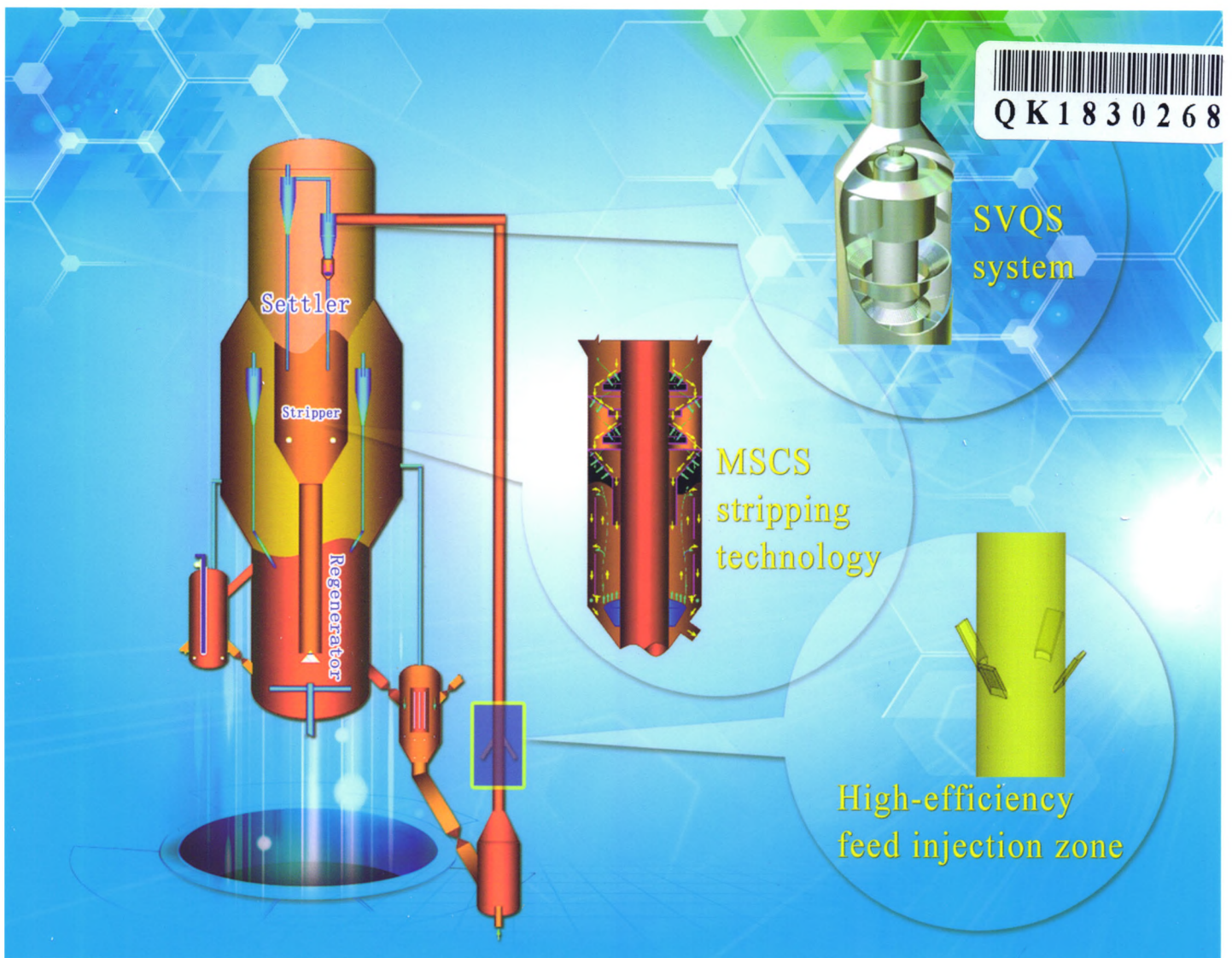


中文核心期刊 Ei核心期刊  
本刊被Ei Compendex,CA,AJ,CBST,Scopus等  
国际重要检索数据库收录

ISSN 1001-8719  
CN 11-2129/TE  
CODEN SXSHEY

# 石油学报 (石油加工)

## ACTA PETROLEI SINICA (PETROLEUM PROCESSING SECTION)



ISSN 1001-8719



中国石油学会主办  
石油化工科学研究院 承办

2018

3  
Vol.34

万方数据

# 石 油 学 报

(石油加工)

第 34 卷 第 3 期 2018 年 5 月

## 目 次

### 特约综述

催化裂化反应系统关键装备技术研究进展 \* ..... 卢春喜, 范怡平, 刘梦溪, 姚秀颖(441)

### 研究报告

金属修饰对活性中孔材料(AMC)裂化性能的影响 ..... 郑金玉, 罗一斌, 喻 辉, 王进山, 刘宇威, 王成强(455)

ZSM-5 催化剂在多周期 MTP 反应中的性质变化及反应行为 ..... 王 林, 孟嘉辉, 焦洪桥, 廖祖维, 雍晓静, 阳永荣, 金政伟, 刘殿华, 梁 彬(465)

低压加氢喷气燃料中残留氯化物的类型及其对喷气燃料色度的影响 ..... 侯 柯, 沈本贤, 孙 辉, 赵基钢(472)

钠含量对片状  $\alpha$ - $\text{Al}_2\text{O}_3$  性能的影响 ..... 苗 壮, 史建公, 郝建薇, 郑建坡(481)

煤负载 Fe/Mo 催化剂在煤/油加氢共炼中的应用 ..... 邓文安, 秦 勇, 杨腾飞, 刘泽超, 孟环爽, 李 传(487)

基于  $[\text{Rh}(\text{CO})_2\text{I}_2]^-$  的 Rh 配合物催化剂的分子设计 ..... 吉文欣, 王殿军, 楚秀秀(494)

18 m 高密度循环流化床提升管反应器内气-固流动轴向分布特性 ..... 苏 鑫, 王成秀, 蓝兴英, 高金森(500)

基于 DPM 模型的旋风分离器内颗粒浓度场模拟分析 ..... 高助威, 王 娟, 王江云, 冯留海, 毛 羽, 魏耀东(507)

催化裂化吸收稳定系统改进流程对比分析 ..... 张继东, 孟 硕, 张海滨, 卢 迪(515)

高压天然气多孔节流效应及冲蚀特性分析 ..... 王江云, 彭贤强, 刘玲莉, 李雅琴, 王 娟(521)

寡聚度对低聚阳离子季铵盐表面活性剂的聚集行为、油-水界面性能及润湿性的影响 ..... 侯研博, 乔富林, 江建林, 秦 冰(530)

重烷基苯磺酸盐溶液中混合无机碱对大庆原油界面流变性质的影响 ..... 伍晓林, 楚艳苹, 周 贺, 罗 庆, 侯兆伟, 张 磊, 张 路(538)

基于模式识别和谱图映射的通用油品调合模型 ..... 王 莹, 杜中元, 李泽飞(545)

连续与间断热作用对复合锂基润滑脂流变特性的影响 ..... 潘家保, 钱 明, 周 彬, 唐铃凤, 曹 帅(552)

电磁效应对含  $\text{SiO}_2/\text{SnO}_2$  复合纳米粒子润滑油的摩擦自修复特性影响 ..... 方建华, 江泽琦, 郑 哲, 丁建华, 姜自超(561)

PODE/柴油混合燃料对共轨柴油机燃烧与排放特性的影响 ..... 姚肖华, 孙 平, 刘军恒, 嵇 乾, 王玉梅, 杨 晨(567)

表面活性剂复配强化微生物修复水土体系中的菲 ..... 尚琼琼, 张秀霞, 李振伟, 张博凡, 熊 鑫(574)

一种应用于双锥型液-液旋流器的导叶设计新方法 ..... 何利民, 田洋阳, 罗小明(581)

长庆油包水乳状液的稳定性与沥青质含量的关系 ..... 赵一路, 康万利, 殷 夏, 耿 杰, 唐雪辰, 杨立华, 苑慧莹(592)

两性表面活性剂/聚合物对稠油水包油型乳状液分水率和降黏率的影响 ..... 孙娜娜, 蒋华义, 解亚鹏, 张兰新, 黄 娜, 靳凯斌(600)

AMPS/HEMA/AA 三元共聚物的合成及其阻垢性能 ..... 余 嵘, 周欣桐, 马志祥, 苏玲莉, 张 桐, 李仲华(607)

表面活性剂和碱对  $\text{Cr}^{3+}$  聚丙烯酰胺凝胶成胶效果的影响及作用机理 ..... 刘进祥, 卢祥国, 张云宝, 曹伟佳, 谢 坤, 潘 赫, 赵劲毅, 李国桥(614)

渣油残炭值的定量关联分析 ..... 刘 玲, 王 威, 田松柏, 施 榕, 董 凯(623)

Aspen Plus 模拟预测常压塔顶冷凝系统露点及 pH 值 ..... 王海博, 李 云, 欧阳文彬, 程光旭, 张耀亨, 李欣昀(629)

豚基数量对聚脲润滑脂性能的影响 ..... 周云帆, 孙洪伟, 刘欣阳, 何懿峰, 郑 会(634)

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

Ei 对中英文摘要的要求(529); 《China Petroleum Processing and Petrochemical Technology》征订启事(544); 《石油学报(石油

加工)》征订启事(628); 《石油炼制与化工》征订启事(633)

信息

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

Ei 对中英文摘要的要求(529); 《China Petroleum Processing and Petrochemical Technology》征订启事(544); 《石油学报(石油

加工)》征订启事(628); 《石油炼制与化工》征订启事(633)

信息

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

Ei 对中英文摘要的要求(529); 《China Petroleum Processing and Petrochemical Technology》征订启事(544); 《石油学报(石油

加工)》征订启事(628); 《石油炼制与化工》征订启事(633)

信息

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

Ei 对中英文摘要的要求(529); 《China Petroleum Processing and Petrochemical Technology》征订启事(544); 《石油学报(石油

加工)》征订启事(628); 《石油炼制与化工》征订启事(633)

信息

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

Ei 对中英文摘要的要求(529); 《China Petroleum Processing and Petrochemical Technology》征订启事(544); 《石油学报(石油

加工)》征订启事(628); 《石油炼制与化工》征订启事(633)

信息

第十二届中美工程技术研讨会煤化工产业转型升级会议简讯(506); 关于《石油学报(石油加工)》网上投稿的特别声明(520);

### \* 封面文章

期刊基本参数: CN11-2129/TE \* 1985 \* b \* A4 \* 198 \* zh+en \* P \* ¥20.00 \* 1200 \* 26 \* 2018-05 本期责任编辑: 黄晓晖

特约英文编审: 孙树瑜教授(沙特阿卜杜拉国王科技大学计算传质现象实验室主任, 博士生导师)

**ACTA PETROLEI SINICA**  
**(PETROLEUM PROCESSING SECTION)**

Vol. 34 No. 3 May 2018

**CONTENTS**

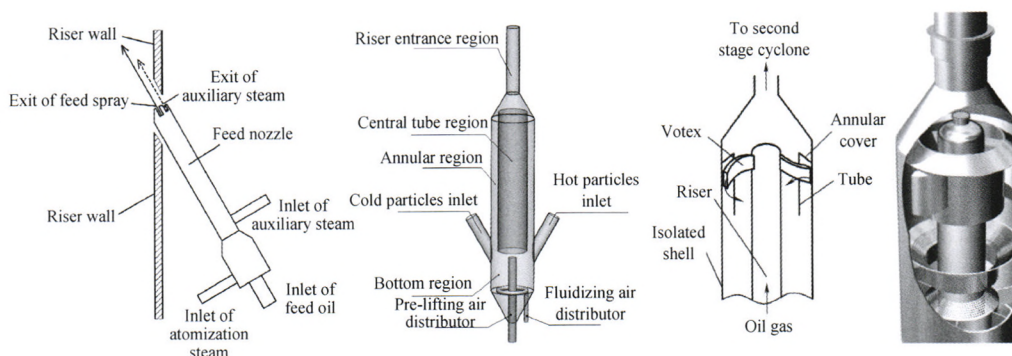
**Special Review**

*Acta Petrolei Sinica (Petroleum Processing Section)*, 2018, 34(3): 0441-0454 doi: 10.3969/j.issn.1001-8719.2018.03.001

**Advances in Key Equipment Technologies of Reaction System in RFCC Unit**

LU Chunxi FAN Yiping LIU Mengxi YAO Xiuying

A new technical idea with the multi-zone cascade controlled and intensified RFCC is proposed process. Its results from the commercial performance test show that the yield of light oil is effectively increased, the yields of off-gas and coke and CO<sub>2</sub> emissions are decreased, thus improving the economic benefit of refinery.



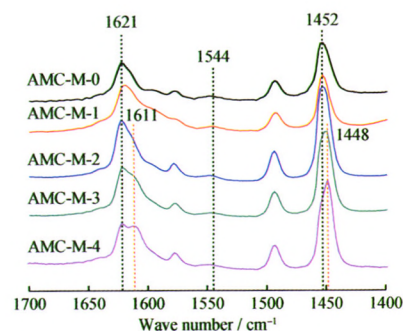
**Research Articles**

*Acta Petrolei Sinica (Petroleum Processing Section)*, 2018, 34(3): 0455-0464 doi: 10.3969/j.issn.1001-8719.2018.03.002

**Investigation of the Effect of Metal-Modification on the Cracking Performance of Active Mesoporous Material**

ZHENG Jinyu LUO Yibin YU Hui WANG Jinshan LIU Yuwei  
WANG Chengqiang

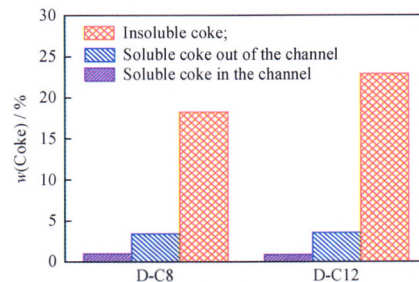
An active mesoporous material referred to as AMC was prepared by gelling, aging and metal-modification process. The types and the content as well as the strength of acid centers can be successfully adjusted by the formation of new bonding structures through the introduction of metal element, which favours the pre-cracking of heavy oil and the increase of cracking activities.



**Catalytic Properties and Reaction Behaviors of ZSM-5 Catalysts in Different MTP Reaction-Regeneration Cycles**

WANG Lin MENG Jiahui JIAO Hongqiao LIAO Zuwei YONG Xiaojing  
 YANG Yongrong JIN Zhengwei LIU Dianhua LIANG Bin

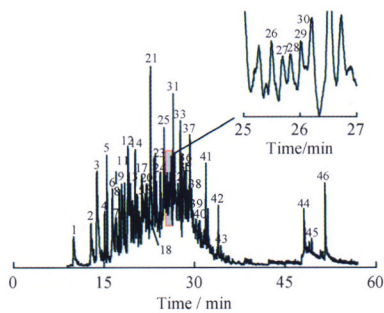
Coking of the catalysts is mainly composed of insoluble coke, which can undergo dehydrogenation, cyclization, and finally become heavy condensed aromatic hydrocarbons and even graphitized carbon as the increasing of the reaction-regeneration cycle, resulting in a gradual increase of insoluble coke.



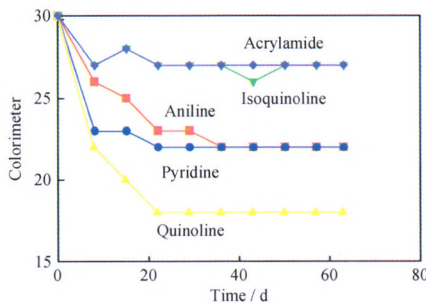
**Residual Nitrides in Low Pressure Hydrogenation Aviation Kerosene and Their Effects on Chroma**

HOU Ke SHEN Benxian SUN Hui ZHAO Jigang

The main nitrogen compounds in residual nitrogen concentrates of low pressure hydrogenation aviation kerosene (LPHJF) are quinoline, pyridine, aniline, isoquinoline and amide, and their influence on the chroma of aviation kerosene is decreasing along the above order. The clay supplemental refining can effectively remove the residual nitrides to ensure the color of aviation kerosene products.



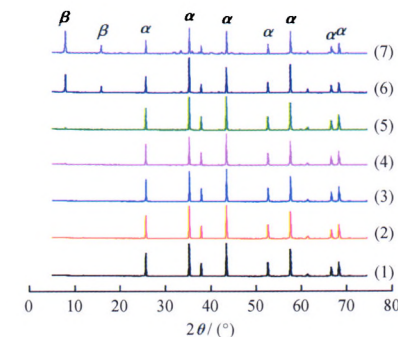
The numbers of 1-46 are ion peak number



**Effects of Sodium Content on the Properties of Laminated  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> Platelets**

MIAO Zhuang SHI Jianguo HAO Jianwei ZHENG Jianpo

$\alpha$ -Al<sub>2</sub>O<sub>3</sub> platelets were prepared via the solid-state reactions and the effects of the additive amount of NaNO<sub>3</sub> on the property of platelets were investigated. XRD patterns exhibits that there is  $\beta$ -Al<sub>2</sub>O<sub>3</sub> appeared in platelets. And with the increasing of additive content of NaNO<sub>3</sub>, the amount of  $\beta$ -Al<sub>2</sub>O<sub>3</sub> becomes higher.

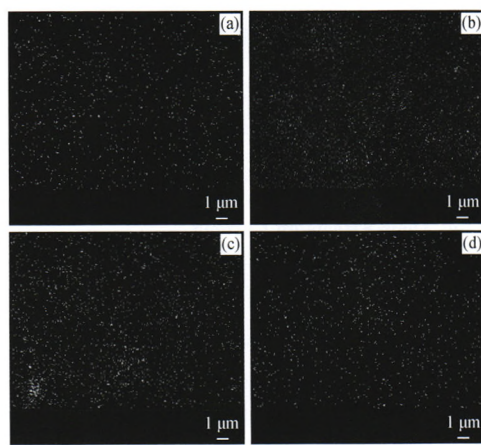


w(NaNO<sub>3</sub>)/%: (1) 0; (2) 0.2; (3) 0.4; (4) 0.6; (5) 1.0; (6) 2.0; (7) 5.0

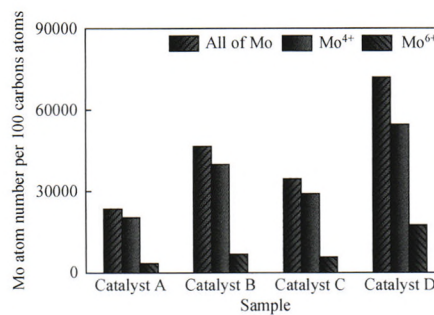
**Application of Coal Supported Fe/Mo Catalysts in Coal/Oil Co-Processing**

DENG Wenan QIN Yong YANG Tengfei LIU Zechao MENG Huanshuang LI Chuan

A kind of lignite was chosen as support to prepare coal supported Fe/Mo catalysts. The activity of catalysts was evaluated in an autoclave. The influences of the addition of Fe component and the impregnation sequence of Fe/Mo components on the catalytic performance were investigated.



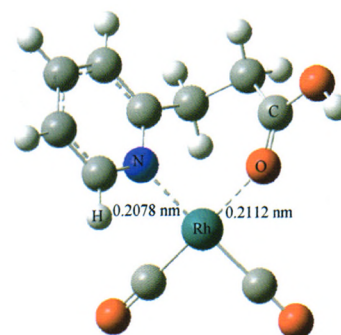
(a) Catalyst A; (b) Catalyst B; (c) Catalyst C; (d) Catalyst D



**Molecular Design of Chelating Rhodium Complex Catalyst Based on [Rh(CO)<sub>2</sub>I<sub>2</sub>]<sup>-</sup>**

JI Wenxin WANG Dianjun CHU Xiuxiu

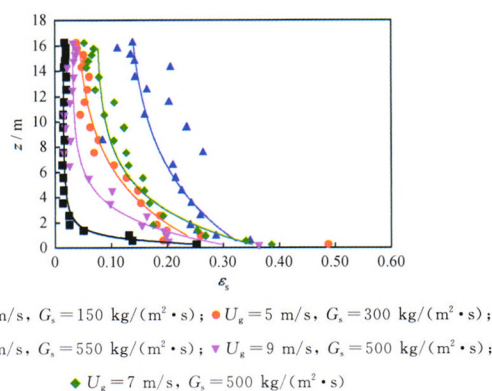
A series of Rh(I) cationic catalysts carbonylation with similar asymmetric bidentate complexes for methanol are designed. The N, O and Rh atoms of asymmetric coordination structure have more activity and stability in methanol carbonylation. Calculation results show that [o-Py-C<sub>2</sub>H<sub>4</sub>COOH-Rh(CO)<sub>2</sub>]<sup>+</sup> is more active (the CH<sub>3</sub>I addition activation barriers: 93.5 kJ/mol) than [Rh(CO)<sub>2</sub>I<sub>2</sub>]<sup>-</sup> produced by Monsanto.



**Axial Distribution of Gas-Solid Two Phases in an 18 m High-Density Circulating Fluidized Bed Riser Reactor**

SU Xin WANG Chengxiu LAN Xingying GAO Jinsen

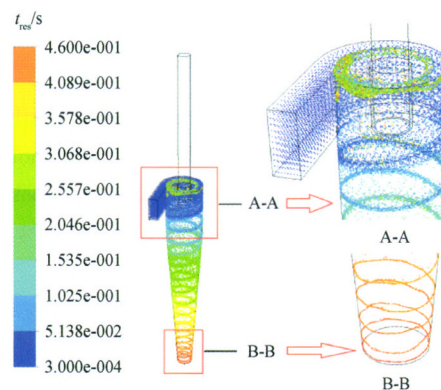
Axial distribution of solids holdup was studied in the circulating fluidized bed riser with 18 m height. The high-density operation has been achieved and the axial distribution presents an exponential type characteristic. In addition the operating conditions also have effect on the axial distribution of solids holdup.



### Simulation Analysis of Particle Concentration of Cyclone Separator Using the DPM Model

GAO Zhuwei WANG Juan WANG Jiangyun FENG Liu Hai MAO Yu WEI Yaodong

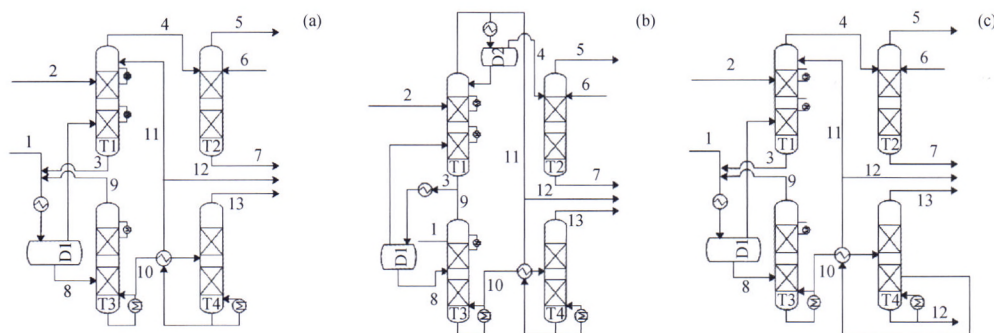
The concentration of particles in the wall were distributed in a spiral gray band, and the width and pitch of the gray bands were different. There was top ash ring under the roof of annular space, where a lot of particles gathered. The top ash ring had a certain periodicity shedding phenomenon. The performance would not only cause the escape of particles and reduce the separation efficiency of cyclone, but also cause erosion wear of the wall.



### Comparison and Analysis of the Improved Absorption-Stabilization System in Catalytic Cracking Process

ZHANG Jidong MENG Shuo ZHANG Haibin LU Di

Both advantages and disadvantages of different absorption-stabilization system in catalytic cracking process are discussed according to the product yield and system energy consumption by process simulation technology, which provides reference and inspiration for process improvement.

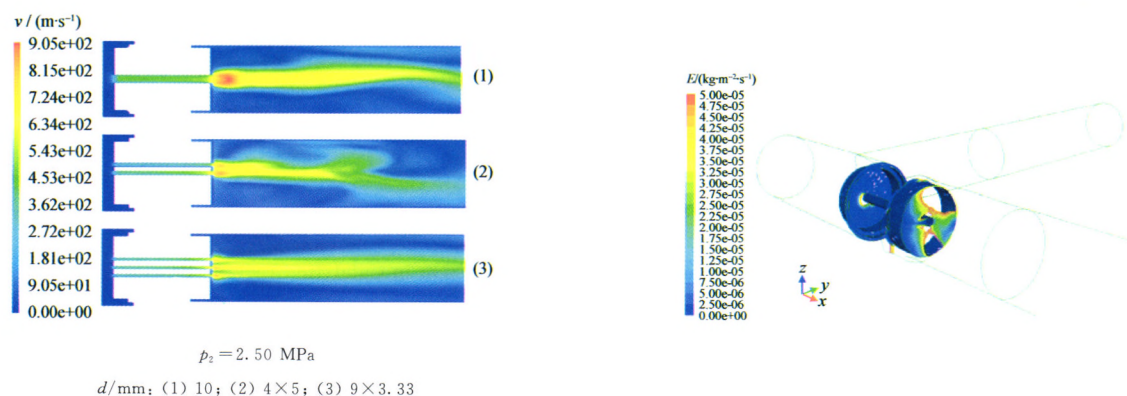


(a) Conventional process; (b) Rich gas directly into the desorption tower process; (c) Stabilizer side-cut naphtha as supplementary absorbent process

**Multi-Hole Throttling Effect and the Erosion Characteristics of the High Pressure Natural Gas**

WANG Jiangyun PENG Xianqiang LIU Lingli LI Yaqin WANG Juan

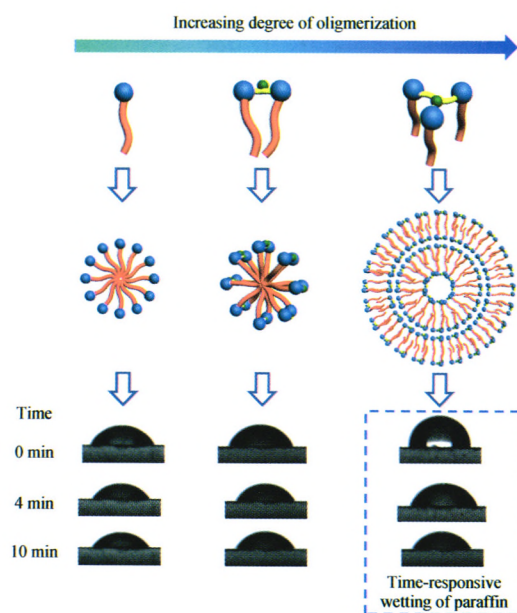
The maximum jet velocity of multi-hole throttle choke is significantly lower than that of the single hole when high pressure natural gas flows through the single hole and multi-hole throttle choke. At the same time, the multi-hole uniform jet can reduce the vortex entrainment and the wall erosion damage, making it is easier to mix the cold core and achieve stable pressure recovery at the role of the multi-jet mixing effect.



**Effect of Degree of Oligomerization on Aggregation Behavior, Oil-Water Interfacial Properties and Wettability of Oligomeric Cationic Quaternary Ammonium Surfactant**

HOU Yanbo QIAO Fulin JIANG Jianlin QIN Bing

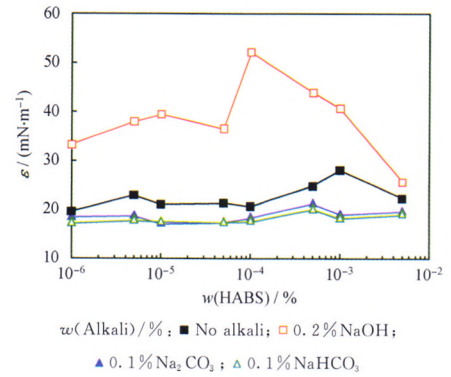
With increasing the degree of oligomerization, the surface activity and aggregation ability of the cationic quaternary ammonium surfactant are enhanced, showing higher efficiency of lowering oil/water interfacial tension and wetting of paraffin. Meanwhile, the wetting is time-responsive for the trimeric cationic quaternary ammonium surfactant with claw-like molecular configuration in aggregates.



**Effect of Mixing Inorganic Alkalis and Heavy Alkylbenzene Sulfonate Solutions on the Dilational Rheological Properties of Daqing Crude Oil**

WU Xiaolin CHU Yanping ZHOU He LUO Qing HOU Zhaowei  
ZHANG Lei ZHANG Lu

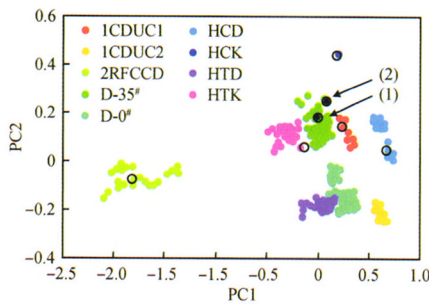
Strong alkali reacts with the petroleum acids of Daqing crude oil, thus the strength of mixed interfacial film is gradually increasing with the increase of alkali concentration, benefiting for the formation of crude oil emulsion. On the other hand, weak base destroy the structure of HABS film, which results in the decrease of modulus.



**General Oil Blending Model Based on Pattern Recognition and Spectra Projection**

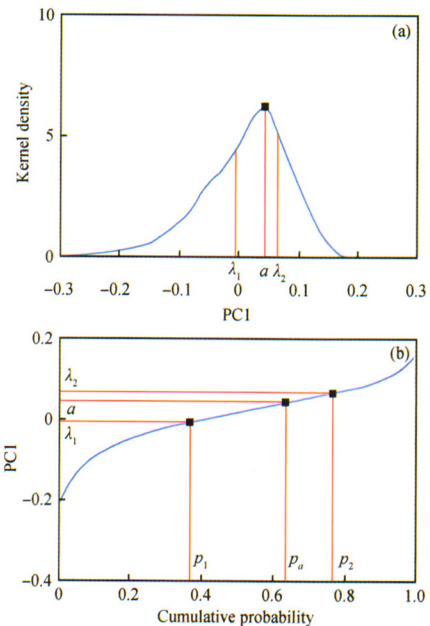
WANG Ying DU Zhongyuan LI Zefei

We propose a novel oil blending model based on the linear correlation between product oil score and components scores in feature space. Kernel density estimation method is used to formulate a constraint region in the product oil samples. This model is still suitable when blend components vary.



PC1—The first principal components;  
PC2—The second principal components;

- Projection of the components and blended product oils spectra;
- Projection of blended spectra;
- (1) Projection of blended product oil spectrum and blended spectrum with  $\varphi(1CDUC1) = 25\%$ ,  $\varphi(2RFCCD) = 10\%$ ,  $\varphi(HTK) = 20\%$ ,  $\varphi(HCD) = 15\%$ ,  $\varphi(HCK) = 30\%$ ;
- (2) Projection of blended product oil spectrum and blended spectrum with  $\varphi(1CDUC1) = 25\%$ ,  $\varphi(2RFCCD) = 5\%$ ,  $\varphi(HTK) = 15\%$ ,  $\varphi(HCD) = 10\%$ ,  $\varphi(HCK) = 45\%$



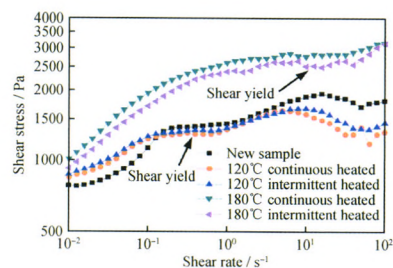
(a) Kernel density function; (b) Inverse cumulative probability function;  
a—Point corresponding to the maximum of kernel density function;  
 $\lambda_1, \lambda_2$ —Lower and upper limits of constraint interval;  
 $p_a, p_1, p_2$ —Probability corresponding to a,  $\lambda_1, \lambda_2$ ;  
the difference between  $p_1$  and  $p_2$  is  $\beta$



**Effects of Continuous and Intermittent Heat Treatment on Rheological Behaviors of Lithium Complex Grease**

PAN Jiabao QIAN Ming ZHOU Bin TANG Lingfeng CAO Shuai

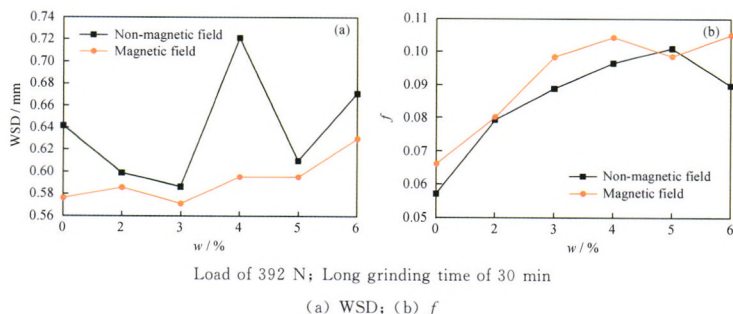
The heated grease sample displays the physical disentanglement variation of grease fiber at 120°C, while the thickener of lubricating grease is oxidized at 180°C. The crack of soap fiber is displayed in the microstructure results and the oxidative product is detected by using FTIR.



**Effect of Electromagnetic Field on Tribological and Self Repairing Performances of Lubricating Oils Containing SiO<sub>2</sub>/SnO<sub>2</sub> Composite Nanoparticles**

FANG Jianhua JIANG Zeqi ZHENG Zhe DING Jianhua JIANG Zichao

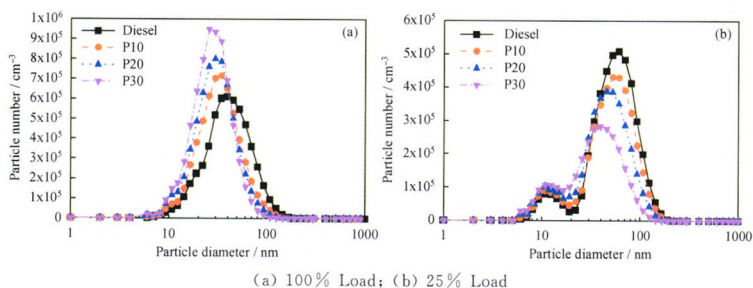
Tribological properties and self repairing performances of lubricating oils containing SiO<sub>2</sub>/SnO<sub>2</sub> composite nanoparticles in magnetic and non-magnetic field were evaluated. The results indicate that the anti-wear, friction-reducing and self repairing performances under magnetic field are more excellent than that in non-magnetic field.



**Effect of PODE-Diesel Blend Fueled on Combustion and Emission Characteristics of a Common-Rail Diesel Engine**

YAO Xiaohua SUN Ping LIU Junheng JI Qian WANG Yumei YANG Chen

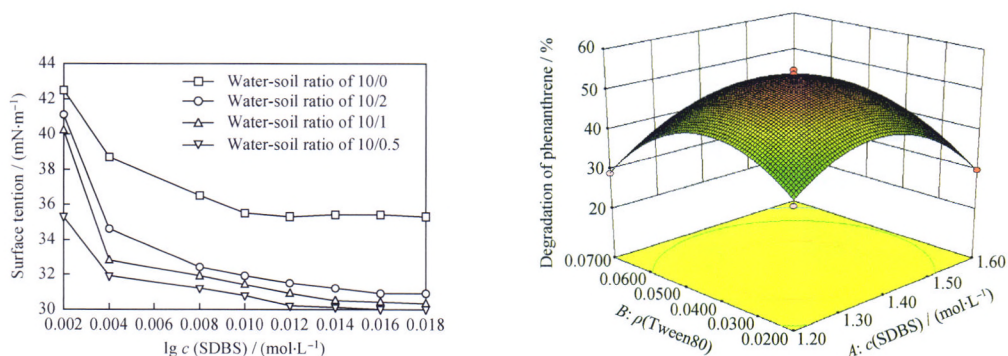
PODE/diesel blended fuel was prepared with the volume fractions of 10%, 20% and 30% in PODE of blend fuels. The effect of PODE addition ratio on combustion and emission characteristics was investigated on a common rail diesel engine. Compared with diesel fuel, at rated speed of 100% load, the peak concentration of particulate matter number was increased. When engine operation at rated speed with 25% load, the peak concentration values of nuclear mode particles number are increased; while the peak concentration value of accumulation mode particles are reduced.



### Enhancing Microorganism Remediation of Phenanthrene in Water-Soil System by Mixed Surfactants

SHANG Qiongqiong ZHANG Xiuxia LI Zhenwei ZHANG Bofan XIONG Xin

The ratios of mixed surfactants are different in different water-soil systems, which are related to the soil adsorption of different surfactants. When the water-soil ratio is 10/1 (mL/g), the optimum mass ratio of sodium dodecyl benzene sulfonate (SDBS) to Tween80 is 9.76/1.

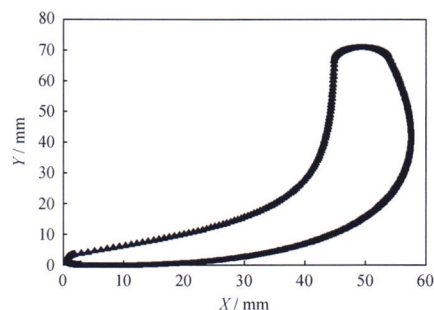


### Research Notes

### A New Method for the Guide Vanes Design in Double-Cone Liquid-Liquid Cyclone

HE Limin TIAN Yangyang LUO Xiaoming

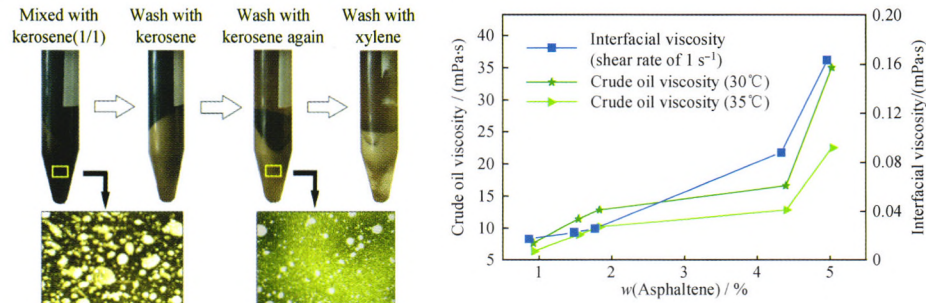
A new parametric design method of guide vanes based on aerodynamic airfoil is raised. The results show that the new method has a good ability of shape-control, and it's easy to quickly modify design parameters and to regenerate vanes. And it can control and accelerate the fluid well, which is beneficial to liquid-liquid separation.



**Relationship Between the Stability of Changqing Water in Oil Emulsions and Asphaltene Content**

ZHAO Yilu KANG Wanli YIN Xia GENG Jie TANG Xuechen YANG Lihua YUAN Huiying

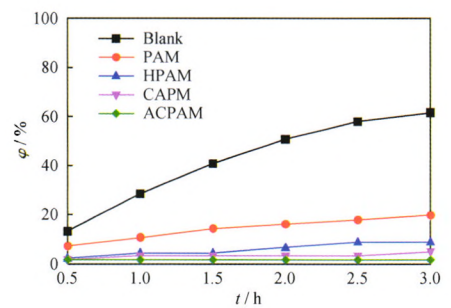
Asphaltene acts as a stabilizing agent in light oil emulsions, while resins do not work. With the increasing of asphaltene content, the interfacial film gets stronger, the oil becomes more viscous. As a result, the emulsion becomes stabler.



**Effects of Amphoteric Surfactant/Polymer on Water Separation Rate and Viscosity-Reducing Rate of Heavy Oil-in-Water Emulsion**

SUN Nana JIANG Huayi XIE Yapeng ZHANG Lanxin HUANG Na JIN Kaibin

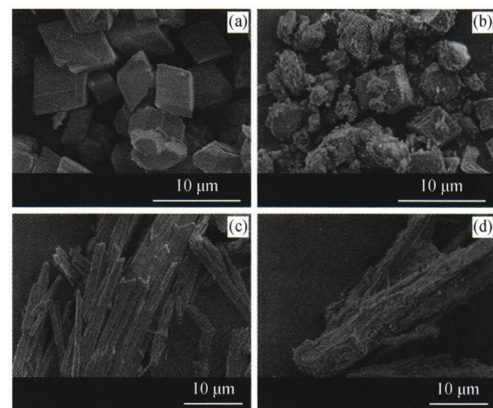
Along with the addition of three kinds of polyacrylamide molecules, the water separation rate decreases obviously. It is because the interfacial film viscoelasticity of emulsion can be enhanced by adsorbing polymer molecules on the oil/water interface.



**Synthesis and Properties of AMPS/HEMA/AA Terpolymer Inhibitor**

YU Rong ZHOU Xintong MA Zhixiang SU Lingli ZHANG Tong LI Zhonghua

Synthesis of terpolymers has been carried out by aqueous solution polymerization method using AMPS, HEMA and AA as monomers. The change of calcium ion and sulfate ion concentration before and after experiment was determined by static method. The monomers of the synthetic copolymer are phosphorus-free, nitrogen-free, and the terpolymer shows excellent scale inhibition performance.

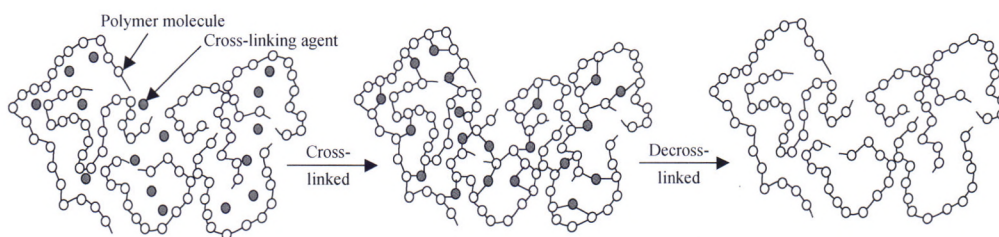


(a) CaCO<sub>3</sub>, without addition of the copolymer; (b) CaCO<sub>3</sub>, addition of the copolymer; (c) CaSO<sub>4</sub>, without addition of the copolymer; (d) CaSO<sub>4</sub>, addition of the copolymer

### Effects of Surfactant and Alkali on the Gelation Performance of $\text{Cr}^{3+}$ With HPAM and Its Action Mechanism

LIU Jinxiang LU Xiangguo ZHANG Yunbao CAO Weijia XIE Kun PAN He ZHAO Jinyi LI Guoqiao

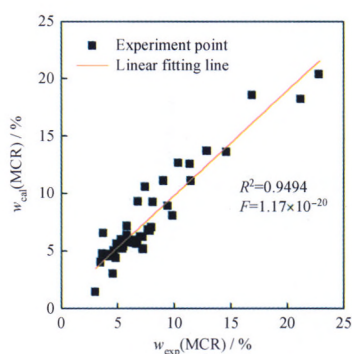
It is good to add  $\text{Cr}^{3+}$  in the polymer solution. The condensation among the molecules of polymer and cross-linking agents can occur. Thus raising the viscosity which has good profile control effect. However, after the gelling  $\text{Cr}^{3+}$  polymer gel encountered the ASP ternary slug, the alkali in the ternary slug rapidly increases the pH of the solution. At high pH the decross-linking reaction of  $\text{Cr}^{3+}$  polymer gel happens, thus the viscosity of the  $\text{Cr}^{3+}$  polymer gel sharply decreases and the profile control effect becomes worse significantly. Therefore, the profile control slug of three compound combination flooding needs to be alkali-resistant.



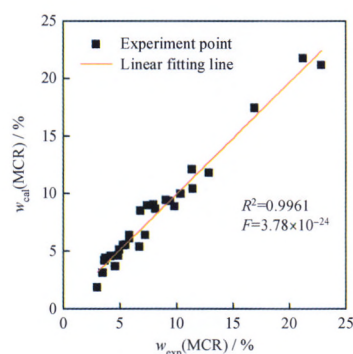
### Quantitative Correlation Analysis of the Residual Oil's Carbon Residue Value

LIU Ling WANG Wei TIAN Songbai SHI Rong DONG Kai

The paper sets up two kinds of quantitative relationship between elemental content or four components (SARA) content and the carbon residue value by using multiple regressions. Both of them consider more factors that affect the carbon residue value. The application scope is much wider than the previous ones, and it well presents the contribution of each component to the carbon residue.



The correlation between the calculated  $w(\text{MCR})$  by elemental content and the experimental  $w(\text{MCR})$

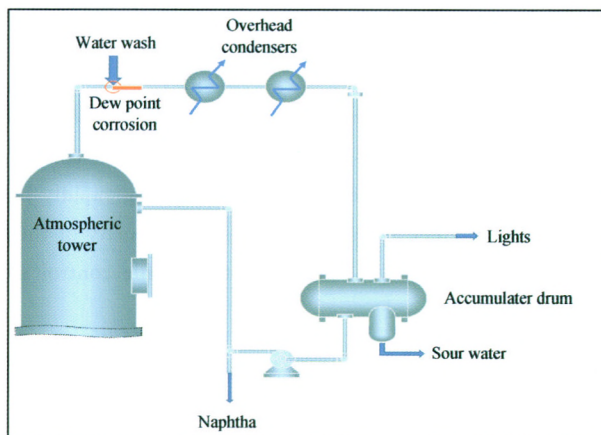


The correlation between the calculated  $w(\text{MCR})$  by SARA content and the experimental  $w(\text{MCR})$

### Aspen Plus Predict Water Dew Point and pH Value of the Overhead Condensing System of Crude Atmospheric Distillation Unit

WANG Haibo LI Yun OUYANG Wenbin  
CHENG Guangxu ZHANG Yaoheng LI Xinyun

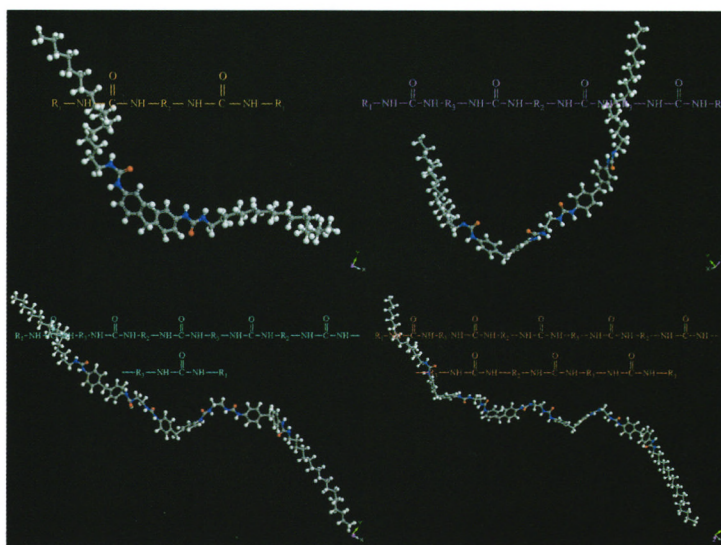
The atmospheric tower overhead vapor is cooled by a series of overhead condensers to keep its final temperature. The primary corrosion in the overhead system is usually caused by HCl in water dew point, which particularly results in severe attack local environments at low pH value of 1.



### Effect of Ureido Amount on the Properties of Polyurea Grease

ZHOU Yunfan SUN Hongwei LIU Xinyang HE Yifeng ZHENG Hui

4,4'-Diphenylmethane diisocyanate, octadecylamine, ethylenediamine were employed to the preparation of diurea, four urea, six urea and eight urea greases. The measurements reveal that with the number of urea groups increasing, the dropping point, shear stability, colloid stability and extreme pressure property improve while the thickening ability decreases.



石油学报(石油加工)  
SHIYOU XUEBAO (SHIYOU JIAGONG)

主 编 汪燮卿

双 月 刊

(1985年3月创刊)

第 34 卷 第 3 期 2018 年 5 月 25 日

ACTA PETROLEI SINICA  
(PETROLEUM PROCESSING SECTION)

Editor in Chief Wang Xieqing

Bimonthly

(Started in March 1985)

Vol. 34 No. 3 May 25, 2018

主 管: 中国科学技术协会  
主 办: 中国石油学会  
编辑、出版:《石油学报(石油加工)》编辑部  
地址:北京市海淀区学院路18号  
邮编:100083  
电话:010-62310752, 010-82368282  
网址:www.syxbsyjg.com  
E-mail:syxb8282.ripp@sinopec.com,  
syxb8282@163.com

副 主 编: 胡晓春  
印 刷: 北京科信印刷有限公司  
发 行:  
国 内: 北京市报刊发行局  
国 外: 中国国际图书贸易总公司  
(中国国际书店)  
北京市 399 信箱

国内订阅处: 全国各地邮局  
报刊登记证: (BJ)第 1404 号

Responsible Institution: China Association for Science and Technology  
Sponsored by: China Petroleum Society  
Edited and Published by: Editorial Office of Acta Petrolei Sinica  
(Petroleum Processing Section)  
Add: No. 18 Xueyuan Road, Haidian District, Beijing 100083, China  
Tel: +86-010-62310752, +86-010-82368282  
Http://www.syxbsyjg.com  
E-mail:syxb8282.ripp@sinopec.com,  
syxb8282@163.com

Deputy Editor in Chief: Hu Xiaochun  
Printed by: Beijing Kexin Printing Co., Ltd.  
Distributed by:  
Domestic: The Bureau of Periodical Distribution, Post  
Office of Beijing  
Abroad: China International Book Trading Corporation  
(Guoji Shudian), P. O. Box 399, Beijing  
(Code No. BM845)

Subscribed by: Local Post Offices in China  
Periodical Registration: (BJ) No. 1404

ISSN 1001-8719  
CN 11-2129/TE

国内邮发代号: 82-332  
国外发行代号: BM845

定价: 20.00 元/期  
120.00 元/年