

use the narrow-cut data and  $K_R$  values for process optimization by either cutting deeper into residua bottoms to increase yield or by selecting the most appropriate process units for the various residue fractions. This information can also be used by upstream operators to determine the economic feasibility of utilizing the end-cut onsite.

**05/02436 The containment of oil spills in unconsolidated granular porous media using xanthan/Cr(III) and xanthan/Al(III) gels**

Gioia, F. and Urciuolo, M. *Journal of Hazardous Materials*, 2004, 116, (1–2), 83–93.

The gelation in situ of aqueous solutions of the biopolymer xanthan gum may be a method for temporarily containing oil spills in soil whilst the remediation procedure is planned and accomplished. The gelling reaction has been carried out using as crosslinking agents either Cr(III) or Al(III) cations. By using Cr(III) the gelation time, which has been measured for a range of xanthan and/or Cr(III) concentrations, is of the order of the hour. On the contrary, the gelation by means of Al(III) cations takes place at quite low pH and is instantaneous. Therefore, depending on the crosslinker adopted, rather different techniques must be used for generating the gel structure in situ. The gels have proven to be suitable for the containment of water and of many hydrocarbons without losing their strength even for a long period of time. The rheological properties of xanthan aqueous solutions evidence a shear-thinning behaviour that is most favourable for the application. Theoretical considerations have permitted the establishment of the mobility conditions of xanthan solutions in porous media before the gelation, and the estimation of a suitable injection pressure. The experiments for investigating the mobility of xanthan solutions in porous media, and for simulating the containment of an oil spill, have been done using packed beds of uniformly sized spherical glass beads, in glass columns. The glass assembly made it possible to visualize the evolution of the phenomena of interest.

**05/02437 Transformation of olefin over Ni/HZSM-5 catalyst**

Yin, C. *et al. Fuel*, 2005, 84, (6), 701–706.

Olefins in the cracked naphtha can be transformed into aromatics and isoparaffin to reduce the olefin content as well as to improve the octane number. In this work, Ni/HZSM-5 bifunctional catalyst was prepared and was characterized by nitrogen adsorption, FT-IR analysis with adsorbed pyridine as well as by X-ray powder diffraction analysis. The activity of the catalyst was investigated with the transformation of 1-hexene. The experimental results show that the main reactions occurring over Ni/HZSM-5 at relatively low temperature are cracking and isomerization of 1-hexene, which results in the high concentration of olefin in the hydrotreated product. The double-bond isomerization of 1-hexene is dominant at low temperature (<220°C) while the skeletal isomerization is elevated at high temperature, and the aromatization activity of the Ni/HZSM-5 catalyst is promoted by high temperature. The sulfided Ni/HZSM-5 catalyst shows higher aromatization activity than the reduced one and the zeolite supported Ni catalysts show comparatively better stability than that without metal components.

**05/02438 Two-step adsorption process for deep desulfurization of diesel oil**

Sano, Y. *et al. Fuel*, 2005, 84, (7–8), 903–910.

An integrated adsorption process for deep desulfurization of diesel fuel was proposed and examined. Conventionally hydrodesulfurized straight run gas oil (HDS-SRGO) having less than 50 ppm sulfur was also adsorptively treated with activated carbon fiber (ACF) to attain the ultra low sulfur gas oil having less than 10 ppm sulfur. The ACF, used in cleaning-up HDS-SRGO, was successively examined in straight run gas oil (SRGO) treatment to enhance its hydrodesulfurization (HDS) reactivity over conventional CoMo catalyst by removing the nitrogen and refractory sulfur species contained in SRGO. Such integrated adsorption–reaction process makes it possible to utilize the maximum adsorption capacity of ACF and achieve ultra deep desulfurization of SRGO. Regeneration of used ACF with a conventional solvent was proved very effective in restoring its adsorption capacity.

**05/02439 Water gas shift reaction kinetics in Fischer–Tropsch synthesis over an industrial Fe–Mn catalyst**

Teng, B.-T. *et al. Fuel*, 2005, 84, (7–8), 917–926.

The kinetics of water gas shift (WGS) reaction over an Fe–Mn catalyst under Fischer–Tropsch synthesis (FTS) reaction conditions is studied in a spinning basket reactor. Experimental conditions are varied as follows: temperature of 533–573 K, reactor pressure of 10.0–26.5 bar,  $H_2/CO$  feed ratio of 0.66–2.0 and space velocity of  $0.66\text{--}2.65 \times 10^{-3} \text{ N m}^3 \text{ kg}_{\text{cat}}^{-1} \text{ s}^{-1}$ . By separately fitting WGS kinetics parameters with experimental data, which is possible in the spinning basket reactor with neglecting concentration and temperature gradients, different kinetics models of WGS are derived and discriminated on the basis of four sets of WGS elementary reactions. Kinetics experimental results show that the WGS reaction under FTS reaction conditions is far from

equilibrium. Two types of WGS mechanisms are investigated. One is the formate mechanism, and the other is the direct oxidation mechanism. It is found that the formate mechanism is better in fitting experimental data than the direct oxidation mechanism over the Fe–Mn catalyst under the FTS reaction conditions. The optimized kinetics model with formate intermediate dissociation as the rate-determining step (RDS) can fit the WGS experimental results well. The simplified WGS kinetics model can easily be used for industrial modelling applications.

## Economics, business, marketing, policy

**05/02440 A simple impedance method for determining ethanol and regular gasoline mixtures mass contents**

Rocha, M. S. and Simões-Moreira, J. R. *Fuel*, 2005, 84, (4), 447–452.

A simple electric impedance sensor embedded in ethanol and regular gasoline blends for determining mass ratios was built and tested in the present work. It was carried out a quantitative evaluation of mixtures for several fuel mass ratios in the temperature range of  $-10$  to  $40^\circ\text{C}$ . A non-linear dimensionless electrical conductivity–fuel mass ratio correlation was obtained for a 0–100% ethanol mass content in gasoline. Tests at different temperatures showed that the temperature had an important influence over the mixture bulk conductivity and sensor signal. This work was carried out following the Brazilian automotive industry trend of using ethanol–gasoline mixtures at any proportion to power passenger automobile engines.

**05/02441 Adulteration detection of Brazilian gasoline samples by statistical analysis**

Wiedemann, L. S. M. *et al. Fuel*, 2005, 84, (4), 467–473.

Unfortunately, addition of organic solvents (heavy aliphatic, light aliphatic and aromatic hydrocarbons) in Brazilian gasoline is very frequent, and this illegal practice does not guarantee gasoline quality. Organic solvent adulterations of gasoline samples have been investigated. For characterization and comparison of these samples, physico-chemical parameters together with gas chromatographic analyses data were proposed as the factors for multivariate analysis. Hierarchical clusters analysis was used to improve the detection of the type of solvent and their relative proportion used for this practice. More detailed information of their compositions was revealed. It was found that using physico-chemical properties of gasoline samples together with statistical analysis are a useful method to adulteration detection.

**05/02442 Causality in variance and the type of traders in crude oil futures**

Bhar, R. and Hamori, S. *Energy Economics*, 2005, 27, (3), 527–539.

This article examines the causal relationship and, in particular, informational dependence between crude oil futures return and the trading volume using daily data over a ten-year period using a recent econometric methodology. The two-step procedure developed by Cheung and Ng in 1996 is robust to distributional assumption and does not depend on simultaneous modelling of the two variables. The study found only causality at higher order lags running from return to volume in the mean as well as in conditional variance. The result is not in complete agreement with several earlier studies in this area. However, the result does indicate mild support for noise traders' hypothesis in the crude oil futures market.

**05/02443 Causes for an asymmetric relation between the price of crude oil and refined petroleum products**

Kaufmann, R. K. and Laskowski, C. *Energy Policy*, 2005, 33, (12), 1587–1596.

The authors revisit the issue of asymmetries in the relation between the price of crude oil and refined petroleum products in the United States. An econometric analysis of monthly data indicates that the asymmetric relation between the price of crude oil and motor gasoline is generated by refinery utilization rates and inventory behaviour. The asymmetric relation between the price of crude oil and home heating oil probably is generated by contractual arrangements between retailers and consumers. Together, these results imply that price asymmetries may be generated by efficient markets. Under these conditions, there is little justification for policy interventions to reduce or eliminate price asymmetries in motor gasoline and home heating oil markets.

**05/02444 Economic and policy implications of public support for ethanol production in California's San Joaquin Valley**

Burnes, E. *et al. Energy Policy*, 2005, 33, (9), 1155–1167.

The US Environmental Protection Agency requires that only oxygenated gasoline may be sold in regions that are not in compliance with national air quality standards. Several non-attainment regions are