Liquid-liquid equilibria of ternary system composed of toluene, heptane, and deep eutectic solvents at 293.15 K ~ 313.15 K

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Deep eutectic solvents (DESs) have been recognized as a benign solvent in many applications including reaction media, catalyst, and biomass conversion. Since the exciting discovery of DESs by Abbott and coworker in 2003, the amounts of research accomplishments has increased tremendously in terms of published in science and technology, in particular, petroleum engineering. DESs are mixtures of a salt and a hydrogen bond donor (HBD) and a hydrogen bond acceptor (HBA). One of most utilized DESs was prepared by using urea as a HBD and choline chloride (HBA) as well as other DESs in this study. Owing to similar vapor pressure of both toluene and heptane, it is not realistic to apply distillation column to separate toluene from heptane containing mixture. It has been widely accepted to apply extraction process to enrich toluene from toluene lean mixture containing heptan rich counterpart compounds. Liquid-liquid equilibria (LLE) behavior was determined using an experimental setup, comprising water jacked glass vials, water circulator, and temperature controller. LLE were measured at three different temperatures, 293.13, 303.15 and 313.15 K. The nuclear magnetic resonance (NMR) and gas chromatography with FID detector were used for determination of phase compositions of each phase. The data obtained experimentally were correlated with the NRTL thermodynamic model.

Biography
Yoon Kook Park is a Professor at Hongik University at Sejong in S. Korea. He has published more than 40 research articles, a book chapter and several patents. He has been serving as an editorial board member of the Korean Journal of Chemical Engineering.

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Corrosion Inhibitor from Palm Lignocellulosic Waste

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Palm tree consists of different parts among which are the leaflet, rachis and fibers. All these parts constitute lignocellulose biomass components capable of producing value added end products. United Arab Emirates contains over 30 million date palm trees, 8 million of them in Alain city. Each palm tree produces at least 25 kg of dried leaves annually which is about 200 million kg of dried leaves annually in Alain city alone. This huge amount of waste is either disposed to landfills or is just burned, which is hazardous to the environment. However once processed palm lignocellulose biomass can produce anti corrosion materials. Corrosion remains one of industrial challenges due to its noxious attack reaction on the metal stimulated by the surrounding environment.

Therefore, the objective of this project is to solve two current problems, which are the waste and the corrosion, with beneficial solution for both the environment and the industry. In the present work, lignin will be extracted from date palm waste and converted to sodium lignosulfonate, which has been proven to be an anti-corrosion material.

The sodium lignosulfonate will be tested for anti-corrosion properties. The results from this study will contribute to environment, chemical industry and contribution to knowledge in the field.

Biography
Nour Abdel Rahman is a Chemical Engineering Master student at UAEU and holds a Bachelor Degree from the same institution. She is also a research assistant at Emirates Center for Energy and Environment, UAE, under the supervision of Prof. Ali H. Al-Marzouqi who is doubles as the Assistant Dean for Research & Graduate Studies and Professor of Chemical and Petroleum Engineering Department, UAEU.
Coupling design of interunit heat integration in an industrial crude distillation plant using pinch analysis

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This study reports ideas raising from an optimization proposal of lumping heat exchanger network of three separate industrial crude distillation units (CDUs) in a northern China bitumen enterprise, with pinch analysis priorly performed on their efficiently-operated preheat trains (PHTs). The end of the work finds further potential progress still in hope of achievement through interunit coupling, although each individual PHT was approaching maximum energy recovery. Simulative trials reveal an extra 9.58% diminishment of energy consumption when using interunit optimization upon innerunit improvements. A necessary economic evaluation verifies that energy cost minimization will recover the investment within a reasonable payback period. This case study illuminated an innovative thought train—finding better-matched heat sources-sinks in exchange of the least physical revamping in an extended-energy system. This way of thinking allows numerous similar refineries, especially in China, to improve their way of using energy.

Biography
Chengtian Cui is a PhD candidate under the supervision of prof. Jinsheng Sun at Tianjin University. He received a B. Eng. in the College of Chemical Engineering from China University of Petroleum (East China) in 2014. He has been interested in process system engineering and petroleum refining engineering. His research interest also covers industrial waste heat recovery, energy efficient distillation operations, and chemical process intensification.

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Development of a new surfactant material for CO$_2$-foam stability

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In contact with oil, CO$_2$ lowers the oil viscosity, causes the oil to swell, overcome the high interfacial tension between oil and rock, dislodge the immobile oil and hence increase the volumetric sweep efficiency. The surfactant must possess suitable structure to successfully play these roles. In this context, a new surfactant with different functionalities has been synthesized to examine its CO$_2$ philicity. The response surface methodology (RSM) was employed to optimize the yield and provide the shortest reaction time using less stringent reaction conditions. Final structure was validated using FT-IR and NMR technique. The surfactant was evaluated for EOR suitability by firstly examining the fluid – fluid compatibility (in different temperatures, salinity and harness tolerance). The ability for foaming is also assessed. The interfacial tension (IFT) between surfactant and CO$_2$ gas at 90°C and upto 2700 psi showed some interesting findings. The IFT of CO$_2$ - brine without surfactant dropped from a value of 70 mN/m to 30 mN/m when the critical pressure approached (1070 psi). It remained 30 mN/m at higher pressures. When surfactant is incorporated the minimum IFT achieved was 1.76 mN/m after the critical pressure is reached. The foam stability of the surfactants was evaluated. The MRF values reflect the same trend as IFT lowering and foam stability. Three tailed surfactant has the MRF of 3.4. AOS (commercial surfactant) MRF was 1.3. It appears that the surfactant having structure which demonstrates favorable CO$_2$ affinity has the largest IFT reduction, highest foam stability and MRF values. This trend is also repeated in the recovery factor achieved by the surfactants when core flood are performed at 90°C and with a working pressure of 1800 psi. The three tailed surfactant provides the highest RF of 96% ROOIP. The adsorption of the surfactant was kept low at less than 0.5 mg/g.
Innovations and technologies for direct conversion of natural gas in SOFCs: A novel Methane-fueled SOFC with molten metal anode

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Conventional coal-fired power plants have low efficiencies and emit large amount of carbon dioxide (CO₂), a greenhouse gas which causes climate change. Natural gas is a cleaner fuel and its combustion emits lesser CO₂ than coal; in addition, the recent boom in shale gas reserves and production with consequent drop in natural gas price has made natural gas a desirable fuel for power generation. A solid oxide fuel cell (SOFC) is an energy conversion device which can directly and efficiently convert the chemical energy in fuels to electricity with low emissions to the environment. Hydrogen is the fuel commonly used in fuel cells, but, in principle, the SOFC can operate on carbonaceous fuels, so a natural gas-fueled solid oxide fuel cell is an attractive technology which can efficiently generate electricity with low emissions compared to existing coal-fired power plants. However the direct electrochemical oxidation of methane in SOFCs is limited by carbon deposition, sintering and sulphur poisoning which result in deactivation of the nickel anode.

Recent innovations and technologies that directly use natural gas in SOFCs will be presented. More importantly, a novel SOFC with molten metal anode, which incorporates a molten metal bath and converts methane directly to electricity and other useful chemicals (e.g. hydrogen), will be presented; results on thermodynamic analysis, design and demonstration of this SOFC will be shown. This device obviates the problems of coking, sintering and poisoning of anodes which limit the performance of a methane-fueled SOFC.

Biography

Oluseye Agbede is a lecturer at the Department of Chemical Engineering, Ladoke Akintola University of Technology Ogbomoso, Nigeria. He did his PhD research at the Department of Chemical Engineering, Imperial College London, UK, under the supervision of Professors Klaus Hellgardt and Geoff Kelsall. He currently carries out research on the production of biofuels from microalgae and direct utilization of biofuels and fossil fuels in solid oxide fuel cells.
Smart bioactive compounds: Their synthesis and potential application in biodiesel oxidation stability enhancement

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The key problem associated with the use of biodiesel is its low oxidation stability which affects its storage and makes it unsuitable for engine. The oxidation of the biodiesel primarily increases the peroxide value and then a decrease as primary products degrades to form secondary products. The increase in peroxide value can impart the rise in cetane number, which reduces ignition delay and can cause various engine problems. As an option to stop or slowing down the oxidation process, antioxidants are added to inhibit the initiation and propagation of free radicals, reducing the formulation of secondary degradation compounds. Butylated hydroxytoluene (BHT), butylated hydroxyanisol (BHA), tert.-butylhydroquinone (TBHQ) and propyl gallate (PG) are commonly used synthetic antioxidants in biodiesel. These synthetic antioxidants are made from non-renewable sources and have carcinogenic health constrains for the living organisms directly exposed to them, because of these negative attributes renewable antioxidant sources containing phenolic compounds are more desirable than the synthetic antioxidants.

In this context, Bio-active compounds like polyphenols which are present in various natural plant based materials and they are very important constituents and plays a crucial role in protecting lipid oxidation. Ginger extract contains phenolic compounds naming gingerol and shogaol which are effective agents for stopping radical propagation. Ginger extract presented greater protection for biodiesel during the oxidation stability test by Rancimat method. A higher percentage of added nature based robust ginger extracts results in the enhancement of the oxidation stability due to the presence of more antioxidant compounds in it.

Biography
Anuchaya devi is a Research scholar, Currently in 4th year of her Ph.D at Department of Energy, Tezpur University. She did her Master degree in Environmental Science from Department of Environmental science, Tezpur University. She has published a number of research articles, book chapters and books in the field biodiesel fuel quality enhancement. She has developed designer biodiesel by blending different non-edible oils in different volumetric ratios with improved fuel quality. In recent times, she is focused on searching some alternative natural antioxidant sources which can be applied to biodiesel in place of synthetic antioxidants for protecting biodiesel from oxidation.

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Pipeline inspection evaluation method for increasing open innovation efficiency in petroleum industry

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Since innovations in petroleum industry are closed and cost oriented, there is a need for a tool that can guide the innovator from beginning of problem definition to autonomous system development as a solution in an effective and efficient way. On the other hand, petroleum industry is a highly sensitive area for safety and security of technological development and conservative in terms of company or research secrets, which creates a need for accurate transmission of definitions to the intended platforms, to evaluate in a right way and transfer the evaluation to a relevant model, which can be used for Open Innovation application in robot-based solutions of petroleum industry.

This work introduces the petroleum robotics, focuses on improvements in in-pipe inspection robot developments and as a first phase of the main part evaluates existing locomotion technologies of chosen robots and evaluating them in variables point of view. From this starting point, own – parameters those are not well considered and explained in the literature will be defined deeper and added to criterion formation. Second phase is evaluation of whole development in 5-points system to give a better view of where the developments stand today. Later on, projects and methods will be presented and evaluated in 5-points evaluation method developed by this work.

Biography
Bahadur Ibrahimov is an Engineer, young researcher in Vienna and freelance consultant. He is originally from Azerbaijan where got his high school education and moved to Istanbul for University Degree. Sean studied at Yildiz Technical University in Istanbul and afterwards in Vienna University of Technology as a State Scholar where he received Master of Science degree in Engineering Management on Petroleum Geology and a PhD degree for his research on the In-Pipe Inspection Robotics and Open Innovation in Petroleum Technologies. This research has taken him all over the world from the Albania, to Shanghai. Previously Bahadur worked at Amplo Consulting Services Company and run Vienna Office as a technology consultant and head of the office.

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Changing of asphaltene structure during in-situ combustion and SAGD

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Thermal analysis of extracted asphaltenes from Yarega heavy crude oil experimental measurements were made for better understanding behavior of the asphaltenes during SAGD (steam) and in-situ combustion (air) methods of heavy oil recovery. Scanning electron microscope (SEM) and second law of thermodynamics were also used. TG curve of the asphaltenes behavior during different methods of recovery. The higher amount of coke yield was obtained as a result of SAGD. It should be noted that this process has the highest temperature range of weight loss and the temperatures of the beginning and the end of process. The energy activation of this process is 248.7 kJ/mol. Asphaltenes during in-situ combustion have no coke yield, but occurs in the highest temperature rate (from 485°C to 521°C) and has the highest energy activation (294.2 kJ/mol).

Based on thermodynamic calculations and photos of coke yields, which were made by SEM, difference between asphaltenes during in-situ combustion and SAGD were obtained.

The asphaltenes have the lower strong and well-ordered structure as a result of in-situ combustion. It could be the reason of absence of coke yield. During SAGD the most strong and well-ordered structure occurs.

Biography
Boytsova Alexandra is a Ph.D, student at Saint Petersburg Mining University, Russia. She has published more than 40 research articles.

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Nano-devices for enhanced thermal energy storage, cooling and sensing

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We are developing nanotechnology enabled platforms for enhancing cooling, sensing, energy storage and safety systems (involving both experimental and computational studies). Coupling of thermal and hydrodynamic features during phase change (boiling, condensation) causes spatio-temporal fluctuations of surface temperature at the micro/nano-scales, which are termed as "cold-spots" and can transmit over 60-90% of the total heat transfer. Using Carbon-Nanotube (CNT) nanocoatings - cooling was enhanced by 60~300% by leveraging cold-spots and the "nano-fin" effect (enhanced surface area). Using silicon nanofins - cooling was enhanced by ~120%. Nano-thermocouples and diode temperature nano-sensors integrated with the nanocoatings enabled the study of chaos/ fractal structures in boiling. Specific heat capacity was enhanced by ~120% using nanofluids. This has applications in the energy technologies, such as: molten salt nanofluids for concentrated solar power/ CSP (thermal energy storage/ TES), nuclear, oil and gas (drilling, reservoir engineering using nanotracers). Microchannel experiments using nanofluids showed that the precipitated nanoparticles behaved as nanofins (enhanced surface area) that dominate heat transfer for micro/nanoscale flows. DPN™ (Dip Pen Nanolithography™) leverages Scanning Probe Microscopy using microfluidics. Commercial microfluidic devices called "Inkwells™" were developed earlier. The next generation microfluidic devices are being developed for DPN (e.g., Fountain Pen Nanolithography, "centiwell"). The applications are in bio-nanotechnology, and nano-sensors for homeland security and explosives detection ("nano-nose"). We invented a gasless process for synthesis of nanoparticles (e.g., graphene, CNT, etc.) under ambient conditions with synthesis temperature less than 300 °C (US Patent 8470285).

Biography

Debjyoti Banerjee received his Ph.D. in Mechanical Engineering from UCLA (with minor in MEMS). He received 3 M.S. degrees and was invited to 4 national honor societies. He attended the Indian Institute of Technology (IIT), Kharagpur for his Bachelor of Technology (Honors). Prior to TAMU, He worked as a Manager of Advanced Research & Technology (ART) group at Applied Biosystems Inc. (ABI), CA, (currently merged into Life Technologies). Also as a Hiring Manager at ABI he hired ~ 30 Ph.Ds in ~6 months and managed a group of 10~15 Ph.D. engineers / scientists. Previously in a singular capacity, he developed from concept to a commercial product at NanoInk Inc. (called"InkWells™", which are microfluidic platforms used for bio/nano-lithography of proteins, nucleic acids, etc.). He has 13 US patents, from his work at ABI, Ciphergen Biosystems, NanoInk, Coventor Inc. and TAMU.

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Application of new space-based PPP-RTK positioning method for determining of exact location of Petroleum off-shore Structures

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In many off-shore applications positions of petroleum structures need to be determined with high precision (sub cm-accuracy). The Global Positioning System (GPS) is very appropriate for this goal. High precise PPP-RTK positioning is in fundamental feasible if corrections from a GPS local (or global) network of stations are applied to the single-receiver data of a off-shore user. In this study we will discuss a technique that allows the single-receiver user to resolve integer ambiguity resolution (IAR) within short time spans and then enable high-precision positioning in off-shore petroleum applications.

Biography
Fereydoun Nobakht-Ersi is a PhD student at University of Tehran, Iran. His research interests are the use of the Global Positioning System (GPS) and mathematical modelling. He has published more than 11 research articles, a book and some lecture notes in the field of positioning and Geoscience.

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Biogas Power- Hydrogen sulfide removal from biogas

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Biogas is a renewable energy source, similar to natural gas, which derived from renewable biomass sources, primarily via a process called anaerobic digestion. Anaerobic digestion is a process involving the breakdown of organic matter by microorganisms, in the absence of oxygen. The main component of biogas is methane gas, which used as a fuel. It could be burned directly or used to run an engine that powers electrical generators, thus the production of electricity and heat. The paper intends to examine the production and use of biogas, with a focus on the most efficient use for electricity generation and heat from biogas derived livestock manure, determining optimum recovery rates of energy, describe option for connection to the electrical power grid, determine the profitability and viability of producing electricity and heat from biogas.

Energy is the gift of nature in various forms. The consumption of the energy is directly proportional to the progress of mankind. As the population, industrialization and standard of living increases, the global demand for energy increases significantly. Electricity is the most consumable form of energy all over the world. The primary source of energy is fossils fuel but the reservoir of fossils fuels are limited and extensive use may cause environmental degradation. Hence, it was always necessary to find an alternative to fossil oil. Today, it seems that we are in the middle of another oil shock and hence the need to find alternative sources, which need to receive more attention for, sustained energy supply.

There is a great deal of environmental pressure in many parts of the world to ascertain how livestock waste can best be handled. Livestock manure, like cow dung in the absence of appropriate disposal methods can cause adverse environmental and health problems such as: pathogen contamination, odour, air borne ammonia, greenhouse gases, etc. Anaerobic digestion has been considered as waste-to-energy technology, and is widely used in the treatment of different organic wastes, for example: organic fraction of municipal solid waste, sewage sludge, food waste, animal manure, etc. Anaerobic treatment comprises of decomposition of organic material in the absence of free oxygen and production of methane, carbon dioxide, ammonia and traces of other gases and organic acids of low molecular weight.

Biography
G. M. Deshmukh is an Associate Professor at Laxminarayan Institute of Technology, RTM Nagpur University, Nagpur (India). He did his doctoral research at B. A. Technological University, Lonere (India). He has published 8 papers in reputed journals.

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The effect of salt on the evolution of subsalt sandstone reservoirs in Kuqa foreland basin, Western China

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It develops two sets of thick salt in the Kuqa foreland basin, which has a great influence on the evolution of subsalt reservoirs. The favorable reservoirs about 4000m-5000m deep which was several hundred meters away from the bottom of the salt body was found in some area based on the logging interpretation technique. A detailed study was done to unravel the formation of the favorable reservoirs subsalt based on the techniques of formation water salinity analysis, scanning electron microscope (SEM) and cast thin section analysis. The results indicate that: in the first stage, the high salinity formation water began to infiltrate and crystallized after the deposition of the salt in the early, which would cause the dropping of the porosity. In the second stage, the formation water salinity was lowered by the activities of the groundwater which caused the dissolution of the salt, then the porosity was released, leading to the formation of the favorable reservoirs. In the third stage, the hydrocarbon was charged and accumulated in the favorable reservoirs.

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The Effect of surfactant on selectivity in extraction of aromatic hydrocarbons from lube oil

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An investigation was conducted effect of addition surfactant on solvent extraction process for light lubricating oil fraction (spindle). The solvent power and selectivity can be further increased by using surfactant as additive which facilitates the separation phase and increases raffinate yield.

In this study, we suggested the use of ethoxylated anionic surfactants (sodium lauryl ether sulfate). The aromatics in the lube oil were extracted at different temperatures (ranging from 333.15 to 343.15K) and different concentration of surfactant (ranging from 0.01 to 0.1 wt %). The extraction temperature and the amount of surfactant in furfural were investigated systematically in order to determine their optimum values. Compositions in mono-aromatics, di-aromatic, poly-aromatics and saturates were determined using UV-Vis spectrophotometry. With addition of the surfactant, the solvent acquire the ability to preferentially extract the polyaromatic instead of the monoaromatic which directly affects the required oil quality. It was found that using 0.01 wt. % surfactant at 343.15K yields the optimum extraction conditions.

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New inflow performance relationship for solution-gas drive oil reservoirs

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IPR describes the behavior of the well's flowing pressure and production rate, which is an important tool in understanding the reservoir/well behavior and quantifying the production rate. IPR is often required for designing well completion, optimizing well production, nodal analysis calculations, and designing artificial lift. In this work, a new model to predict the IPR curve was developed, using a new correlation that accurately describes the behavior the oil mobility as a function of the average reservoir pressure. This new correlation was obtained using 47 actual field cases in addition to several simulated tests. After the development of the new model, its validity was tested by comparing its accuracy with that of the most common IPR models such as Vogel, Fetkovich, Wiggins, and Sukarno models. Twelve field cases were used for this comparison. The results of this comparison showed that: the new developed model gave the best accuracy with an average absolute error of 6.6 %, while the other common models are ranked, according to their accuracy in the following order to be Fetkovich, Sukarno, Vogel, and Wiggins, with average absolute errors of 7 %, 12.1 %, 13.7 %, and 15.7 respectively. The new developed IPR model is simple in application, covers wide range of reservoir parameters, and requires only one test point. Therefore, it provides a considerable advantage compared to the multipoint test method of Fetkovich. Moreover, due to its accuracy and simplicity, the new IPR provides a considerable advantage compared to the widely used method of Vogel.

Biography
Mohamed Worked as a teaching assistant at Faculty of Engineering, Petroleum Department, Cairo University from Oct, 2003 till August, 2009. Currently, he is working as a Training Manager at Weatherford International and Lecturer at the Australian College of Kuwait “ACK” (School of Engineering, Petroleum Department). mola_elias@hotmail.com
Utilization of fusel fuel as alternative fuels in SI engines

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Alternative fuels are becoming important due to higher energy demands with limited fuel supplies. Fuel efficiency and pollutant reduction are demanded by the combustion industry due to the high cost of fuel and also because of environmental regulations. Combustion is continuously predicted to be the most important method of generating energy for the next 30 years. High thermal efficiency combustion technology and alternative fuels produced from local feedstock are possible long-term solutions. The transport sector continues to account for a large share of humanity's total energy usage, and the road transport sector is characterized by near-total reliance on fossil fuels. A lot of efforts are currently going on worldwide to find alternative fuels which may meet our present and future demands for energy, without causing further global-warming effects. Alternative fuels that are currently in use and under consideration are all still carbon based.

The term ‘alternative fuel’ describes any fuel other than conventional fossil fuels that is used in the transportation sector. Fusel oil is a by-product obtained through the fermentation of some agricultural products such as beets, cones, grains, potatoes, sweet potatoes, rice and wheat. Fusel oil can be used as a clean and high-efficiency spark ignition fuel with a reduced NOx. The octane number and density of fusel oil present the most important properties that make fusel oil as a candidate for an alternative fuel for SI fuel engines.
Role of bio-surfactant produced by *Acinetobacter Calcoaceticus* PTCC 1318 and its potential application for oil recovery using MEOR technology

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In the current scenario, the demand for energy is considered to be the major target for industries. Among the various sources of energies, crude oil plays a vital role. Oil recovery is achieved using conventional primary and secondary recovery methods. In order to recover the remaining residual oil, technologies like Enhanced Oil Recovery (EOR) are utilized which is also known as tertiary recovery. Among EOR, Microbial enhanced oil recovery (MEOR) is a technique which enables the improvement of oil recovery by injection of bio-surfactant produced by microorganisms. Bio-surfactant can retrieve unrecoverable oil from the cap rock which is held by high capillary force. Bio-surfactant is a surface active agent which can reduce the interfacial tension and reduce viscosity of oil and thereby can be recovered to the surface as the mobility of the oil is increased. Research in this area had shown promising results besides the method is eco-friendly and cost effective compared with other EOR techniques.

In this current research work, in laboratory scale we produced bio-surfactant using the strain *Acinetobacter Calcoaceticus* (PTCC 1318) where fermentation was carried out at 40° C, pH 7.0 and 180 rpm. Bio-surfactant analytical studies revealed that *Acinetobacter Calcoaceticus* (PTCC 1318) has the capability to grow and produce maximum bio-surfactant leading to the reduction of interfacial tension from 51 mN/m to 8 mN/m. Further evaluation of oil recovery using sand packed column experiment gave a maximum recovery of 12% after water flooding.
A cleaner diesel combustion. Is it possible?

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Diesel engines have been extensively used in Europe for passenger cars, light and heavy duty vehicles. A very strict regulatory is effective in Europe, US and Japan to have cleaner vehicles and reduced fuel consumption. As a combustion strategy for light loads, premixed combustion presents great results in terms of NO\textsubscript{X} and Soot emissions. However, mid and high loads cannot take full advantage of this concept due to hardware limitations. Is there a way to obtain a Clean Diesel engine with a diffusive combustion? Based on recent research, it seems to be feasible to develop Diffusion-flame Low temperature combustion concept avoiding simultaneously NO\textsubscript{X} and Soot emissions. The strategy is based mainly in a significant reduction of the equivalence ratio at the lift-off length cross section and the combustion temperature, maintaining the conventional mixing controlled diesel jet structure.
Ideal petrophysical and stratigraphic-structural characteristics for a hydrocarbon reservoir: The case-study of the Tertiary “Lignitifero” basin of Sulcis (south-western Sardinia, Italy)

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The 300m thick Eocene–Oligocene terrigenous Cixerri Formation marks the middle Eocene Pyrenean unconformity and frequently covers unconformably the 80 m thick Early Eocene Lignitifero Fm, a terrigenous coal-seam rich unit deposited in coastal to palustrine-deltaic environments. The deposition of the Cixerri Fm started with small alluvial fans and ultimately evolved to fluvial deposits in braided to meandering stream environments. The Cixerri Fm was deposited by a fluvial network formed by a main W-E directed trunk and a NW-SE directed minor branch that ultimately joined together. The Cixerri Fm passes unconformably upwards to the coarser braided to fan-delta deposits of the Ussana and Flumentepido Fms that indicate the transition from a quiet tectonic environment to an active tectonic phase. In the meandering upper part of the Cixerri Fm the channelized sandbodies might potentially act as sealed reservoirs for rising fluids and gases coming from the decay of the organic matter contained in the Lignitifero Fm. Thus a detailed study aimed to investigate the potentiality of the upper Cixerri Fm as an oil field is in progress. This study takes place by analyzing samples collected both from outcrops and from cores; these latter cross all the thickness of the Cixerri Fm down to the Lignitifero Fm. In this way we will determinate the stratigraphic-structural setting and the petrophysical features of the sandbodies.
Performance evaluation of AERMOD for Indian geo-mining conditions

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Dispersion models are useful tool for air quality management in mining industry especially for surface mines. However, application of these models without proper evaluation may lead to wrong decisions which can further lead to closer of mine due to inappropriate mitigative measures. Indian geo-mining conditions are different from other countries. Thus systematic model evaluation studies are essential required to model application in mining industry of India. AERMOD is a model, widely used in the world for dispersion modelling from mining activities. Statistical parameters were considered for the performance evaluation of the AERMOD. An opencast mine was considered as a study area due to multiple dust sources availability. Results have suggested that the model performs well for the Indian geo-mining conditions for daily and monthly averaging time period. Results have also suggested that the model does not predict dust dispersion accurately for smaller values.
Hydrocarbon Charge History of Zhahaquan Oilfield, Western Qaidam Basin

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The Zhahaquan area is a typical tight-oil exploration area in the western Qaidam Basin. However, due to the late study of the tight-oil, research of the region is less, so that the oil accumulation evolution of Zhahaquan area is unclear. In this paper, the dynamic evolution and accumulation of oil and gas is studied deeply by the analysis of reservoir quantitative grain fluorescence (QGF), fluid inclusions petrography and micro-temperature measurement, as well as the burial and thermal history of this area. The results indicate that: (1) the QGF index of Zhahaquan area is mainly between 2-6 and the peak of the spectrum is around 400nm, which indicates that the charging oil is mainly light to medium crude oil; (2) two types of hydrocarbon fluid inclusions are mainly developed in this area, oil inclusions with yellow-yellow green fluorescence and oil inclusions with blue fluorescence, while the former is more common; (3) based on the analysis of the homogenization temperature of inclusions and the burial and thermal history, it is concluded that there are two stages of hydrocarbon charging, of which the first charging time was around 13Ma, which corresponds to the end of the deposition of Upper Ganchaigou formation, the second charging time was about 6Ma, which corresponds to the early deposition of Shizigou formation.

Biography
Wang Lin gained her bachelor degree in Nanjing university, China. And majored in geochemistry. Now she has her expertise in petroleum resource engineering and does her research in research institute of petroleum exploration & development, Petrochina. Her work mainly focus on oil and gas accumulation of Qaidam basin, China, based on the analysis of fluid inclusion, quantitative grain fluorescence, laser Raman spectroscopy et al.
Numerical study on multi-fracture propagation geometries in multiple fracture treatments: the effects of stress shadow

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When multiple fractures are created in a horizontal well, the effects of stress shadow or stress interference become an important consideration. Fracture spacing, fracture width distributions and propagation paths are all associated with stress shadow effects. Consequently, to make rational decisions on completion strategies and production performance analysis, operators need to make clear the stress shadow effects among multi-fractures.

In this paper, a multi-fracture propagation model was established to study the effects of stress shadow numerically. In the model, the stress field of multiple fractures was calculated by pseudo 3D boundary element method. Fluid flow was described by the lubrication equation. Fracture propagation velocities and paths were explicitly determined by subcritical fracture propagation law and maximum energy release rate law respectively. Multiple fractures propagation paths under different fracturing modes, such as consecutive fracturing and simultaneous fracturing in one well or pad, were investigated by this model. The results show that uneven fracture geometries can be the result of stress shadow, which limits the fracture cluster number in one stage operation. Nonuniform fracturing spacing may aggravate the nonplanar propagation trajectories for simultaneous growth due to unequal induced stresses among each fracture. Changing fracturing sequences in multiple-well fracturing can minimize the effect of stress shadow. Operators should pay more attention on fracture spacing distributions and fracture sequences to make rational decisions on completions strategies and production performance analysis.
Mid-Oceanic Ridge type of seismicity all along the axial trough of the Red Sea

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Some 83% of the seismic moment of the instrumental seismicity of the Red Sea between latitude 13⁰N and 28⁰N is associated with earthquakes epicentered along its axial trough. Most of these have occurred in the form of sequences and swarms and are believed to be volcanic related. Some 16.1% and 92.7% of its seismic moment are associated with earthquakes shallower than 10km and 40 km respectively, which indicate that lithospheric deformations beneath this trough are acting partially within the crust and largely within the underlying uppermost mantle. The seismicity appears to slightly deeper beneath the northern part where 98% of the energy is released from depths ≥ 30.1km, while only 72.1% of the energy is released from depths ≥ 20.1km beneath the southern part. Some 62% and 99% of the seismicity of the axial trough had magnitudes less than 4 and 6 respectively. Only 8 earthquakes had magnitudes 6 – 6.9, not less than 4 of these are epicentered along the NE trending strike-slip faults. Calculated b-values for the whole length of the axial trough and the NE trending strike-slip faults are 1.02 – 1.08 and 1.26 – 1.4 respectively. Such seismological characteristics are comparable with those of the crests and strike-slip faults of mid-oceanic ridges. These may be taken together with the previously published bathymetric, heat flow, gravity, magnetic and seismic results to conclude that the axial trough all along the Red Sea appears similar to that of typical well-developed mid-ocean ridges.