EDITORIAL

Did you Ask for the Importance of Investigations Concerning the Chain of a Sustainable Petroleum and Oil Exploration, Production, Flow, and Fast Optimal Refining Technology?

On behalf of the Editorial Committee of the International Journal of Petroleum Technology I have the honour and great pleasure to launch and preface the first, inaugural issue of the journal. Our aim is to publish research and development works of high technical standards with an appropriate balance of practice and theory encapsulating the broad topics of Petroleum and Oil Technology.

The journal will publish original research articles and insightful reviews in all aspects of this field. It specifically encourages articles that represent numerous investigations and important advances realized in the domain of petroleum technology with the following (not limited to) areas of interest: Production of hydrocarbons, Petroleum Exploration (Drilling, Production and Flow), Single and Multiphase Fluid Flows in Porous Media, Physical-Chemical Properties and Rheological Behaviour, Petroleum Geochemistry, Petro Physics, Petroleum Economics, Petroleum Geology, Oil Refining and Process Engineering, Synthetic Fuel Technologies, Oil Shale Technology, Drilling and Drilling Fluids.

Moreover it provides cross learning between scientific and technological realms along with economics and business disciplines comprising exploration, drilling, production and processing; taking into account the public concerns such as environment, health and safety. This involves original investigations that concern or are focused on the multiscale approach of the modern, sustainable green petroleum and oil technology which are to be encountered in the factory (refinery) of the future and process intensification that requires new green technologies (catalysts, green solvents, exchangers, reactors, separation equipments, etc).

This first issue of our journal contains four scientific and practical papers prepared in the spirit of creating the challenge to scientists, engineers and people working in practical branches of oil and petroleum to serve engineering sciences and technology.

The first paper entitled "*Mass Transfer Resistances at the Boundary of a Fractured Porous Medium*" by E. Morales-Zarate and G. Espinosa Paredes considers an important technological problem encountered in the fracturation of the porous media in oil extraction.

The aim of this paper is study of the mass transfer resistance effects at the boundary of a fractured porous medium. Numerical modeling experiments taking into account surface transport, mass transfer and interfacial phenomena have shown the importance of a parameter that is the relation of the mass transfer resistance by diffusion under transient conditions between the porous medium and the homogeneous fluid. This parameter is considered to facilitate the mass transfer of the porous region to the fluid region. We can imagine the importance of such investigations for a sustainable extraction of shale oil.

The second paper entitled *"Improved determination of Apparent and Plastic Viscosity for Aqueous Solution of Drilling Fluid Additives"* by D.K. Rajak, A. K. Pathak and C. Guria explains the complex rheological behavior of drilling fluids. The investigation deals with the improved estimation of shear rates of drilling fluids with varying rotor rotation using a coaxial-cylinder Fann viscometer, which is based on generalized difference equation under purely steady, laminar and isothermal tangential fluid flow conditions. It is well known that exact determination of shear rates helps to predict apparent and plastic viscosity very accurately, which will help to monitor drilling operation efficiently. The proposed equation was used to calculate shear rates accurately (hence apparent, plastic viscosity and yield point) for several green non-Newtonian fluids, mainly, aqueous suspension of bentonite, xanthan gum, poly anionic cellulose and carbomethoxy cellulose solution which are generally considered for rheological studies. The predicted consistency plots were compared with those which are obtained from the conventional method of

estimating the rate of shear for drilling fluids and improved results were obtained using the proposed equations. It has to be underlined that the proposed rheological analysis is quite general and can be applied to drilling fluids with non-Newtonian behavior.

The third paper entitled “A New Model for Accurate Prediction of Pressure Drop in Gas Well” by F. Adesina and O. Olalekan presents an analytical model for predicting the pressure at any point in a flow string from the bottom hole to the well head. Such a model is essential in determining the optimum production string dimension and the design of gas-lift installations. Most of the early models were based on steady state fluid flow equation that did not consider time factor resulting inaccurate and early production time. In this study the authors originally propose a model capable of estimating pressure transverse with accuracy at all times in flowing well bore. This leads to develop equation for pressure drop in flowing vertical well without neglecting any term in the momentum equation by inclusion of accumulation and kinetic terms. The analytical solution of the resulting differential equation gives functional relationship between flow rates and pressure at any point in flowing well at any given time. The results show improvement over previous studies on the prediction of the pressure drop in gas well. The assumptions previously neglected were attempted to be considered. This study clearly shows that a realistic hydrodynamic model which considers all pressure losses terms, pressure drop in vertical flowing gas wellbore leads to more realistic results that include the initial unsteadiness phenomenon and hence predict pressure transient at any given production time accurately.

The last article of the present issue of the journal entitled *“Black Box Modelling of Gasoil Hydrotreating by Artificial Neural Networks”* by G. Otmanine, K. Bedda and N. Bentahar concerns the use of the Black Box type modelling by Artificial Neural Networks (ANNs) to model the hydrotreating process at pilot scale and to predict the product quality of the gas oil (sulphur content) as a function of different process operating variables (temperature, pressure, space velocity, load sulphur content and the number of hydrotreating stages). The approach used in this work is an artificial intelligence approach using artificial neurons of the Multi Layer Perceptron (MLP) network type. Network learning (NL) is carried out according to the Backpropagation Gradient algorithm with momentum. The Early Stopping (ES) technique has been used to prevent the effect of over fitting which presents a good generalization of the model. Experimental and predicted results applied to a gas oil hydrotreating two-stage process show good agreement with an error not exceeding 4%. It is important to note that the use of such a model on an industrial case could rend enormous services. Indeed as indicated by the authors, it would focus the attention of operators when there are failures in the operation of the process, for example during the aging of the catalyst. Moreover it is very important to emphasize that the implementation of such models in refinery is much simpler than the pilot-scale because the availability of large quantities of data. In fact the monitoring of the process is carried out in a rigorous manner several times a day.

To sum up it can be concluded that the contents of the previous four articles published in this first issue of the International Journal of Petroleum Technology is focused on a large topic concerning the chain of petroleum and oil sustainable exploration, production, flow and fast optimal refining technology.

This establishes a platform for future articles in the numerous fields involved in the research and development required for the green petroleum and oil technologies.

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