Fuel Research; Recent Findings from China University of Petroleum (East China) Has Provided New Information about Fuel Research (Sticky Layers Affect Oil Transport Through the Nanopores of Realistic Shale Kerogen)

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2022 FEB 21 (VerticalNews) -- By a News Reporter-Staff News Editor at Nanotechnology Weekly -- Investigators publish new report on Fuel Research. According to news reporting out of Qingdao, People's Republic of China, by VerticalNews editors, research stated, "Understanding the transport mechanism of hydrocarbons through kerogen nanopores is crucial to shale oil production. However, existing studies primarily focus on single-component hydrocarbons; some important characteristics of shale kerogen were not thoroughly accounted for, such as the rough kerogen surface, the existence of heteroatoms, and the cylindrical pore geometry."

Funders for this research include National Natural Science Foundation of China (NSFC), Applied Fundamental Research Project of Qingdao, NanoGeosciences Lab at the **Bureau of Economic Geology**, Jackson School of Geosciences, The University of Texas at Austin.

Our news journalists obtained a quote from the research from the China University of Petroleum (East China), "We study the adsorption and pressure-driven flow behavior of multicomponent hydrocarbon mixtures through realistic shale kerogen nanopores. For the first time, we show that caused by the strong attraction from the kerogen substrate and its rough surface, hydrocarbons exhibit a parabolic velocity profile only in the central pore, and a sticky layer forms upon the kerogen surface. Our results contradict the fast mass transport reported in previous studies, in which ultrasmooth carbon nanotube or graphene was used to mimic shale kerogen. The existence of a sticky layer decreases the mobilized crosssectional area of the kerogen pore, which dramatically impedes the transport capability of shale oil. Increasing the driving force or the proportions of light components will shrink the sticky layer and enhance fluid mobility. CO2 injection performs well in recovering the hydrocarbons of the sticky layers by reducing the thickness and viscosity."

According to the news editors, the research concluded: "This study, which stresses the need for taking into account the realistic kerogen structure in future studies, sheds light on the exploitation of shale oil resources and, more generally, for mass transport in nanoporous materials."

This research has been peer-reviewed.

For more information on this research see: Sticky Layers Affect Oil Transport Through the Nanopores of Realistic Shale Kerogen. Fuel, 2022;310. Fuel can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - www.elsevier.com; Fuel - www.journals.elsevier.com/fuel/)

Our news journalists report that additional information may be obtained by contacting Sen Wang, China University of Petroleum (East China), School of Petroleum Engineering, Qingdao 266580, People's Republic of China. Additional authors for this research include Yipu Liang, Qihong Feng and Farzam Javadpour.

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