Alkanes - Methane; New Methane Findings Has Been Reported by Investigators at China University of Petroleum (Supercritical Methane Diffusion in Shale Nanopores: Effects of Pressure, Mineral Types, and Moisture Content)

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2018 MAR 2 (VerticalNews) -- By a News Reporter-Staff News Editor at Energy Weekly News -- Researchers detail new data in Alkanes - Methane. According to news reporting originating in Qingdao, People's Republic of China, by VerticalNews journalists, research stated, "Using molecular dynamics, we simulated the diffusion behavior of supercritical methane in shale nanopores composed of different matrix mineral types (organic matter, clay, and calcite). We studied the effects of pore size, pore pressure, and moisture content on the diffusion process."

Funders for this research include Ministry of Education of the People's Republic of China, Ministry of Science and Technology of the People's Republic of China, China Postdoctoral Science Foundation, Ministry of Human Resources and Social Security, National Natural Science Foundation of China, Natural Science Foundation of Shandong Province, NanoGeosciences lab at **Bureau of Economic Geology**, The University of Texas at Austin.

The news reporters obtained a quote from the research from the China University of Petroleum, "Our results show that confined methane molecules diffuse more rapidly with increases in pore size and temperature but diffuse slowly with an increase in pressure. Anisotropic diffusion behavior is also observed in directions parallel and perpendicular to the basal surfaces of nanoslits. We also found that mineral types composing the pore walls have a prominent effect on gas diffusion. The perfectly ordered structure and ultrasmooth surface of organic matter facilitate the transport of methane in dry pores, even though its adsorption capability is much stronger than that of inorganic minerals. Moisture inhibits methane diffusion, but this adverse effect is more evident in organic pores because water migrates in the form of cluster, which acts as a piston and severely impedes methane diffusion. However, only an adsorbed water membrane is present at the surfaces of inorganic materials, leading to a weaker impact on methane diffusion. Remarkably, the ratios of the self-diffusion coefficients of the confined fluid and bulk phases at different temperatures collapse onto a master curve dependent solely on the slit aperture. Therefore, we propose a mathematical model to facilitate up-scaling studies from atomistic computations to macroscale measurements."

According to the news reporters, the research concluded: "The findings of this study provides a better understanding of hydrocarbon transport through shale formation, which is fundamentally important for reliably predicting production performance and optimizing hydraulic-fracturing design."

For more information on this research see: Supercritical Methane Diffusion in Shale Nanopores: Effects of Pressure, Mineral Types, and Moisture Content. Energy & Fuels, 2018;32(1):169-180. Energy & Fuels can be contacted at: Amer Chemical Soc, 1155 16TH St, NW, Washington, DC 20036, USA. (American Chemical Society - www.acs.org; Energy & Fuels - www.pubs.acs.org/journal/enfuem)

Our news correspondents report that additional information may be obtained by contacting S. Wang, China Univ Petr East China, Qingdao 266580, People's Republic of China. Additional authors for this research include Q.H. Feng, M. Zha, F. Javadpour and Q.H. Hu.

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Keywords for this news article include: Qingdao, People's Republic of China, Asia, Methane, Alkanes, China University of Petroleum.

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