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1. *Findings from Southwest Petroleum University Provides New Data on Nanoporous (Pore-scale Modelling of Water Sorption In Nanopore Systems of Shale)*

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News	Timeline: Jun 01, 2023 to Jun 30, 2023

Findings from Southwest Petroleum University Provides New Data on Nanoporous (Pore-scale Modelling of Water Sorption In Nanopore Systems of Shale)

Nanotech Daily

June 30, 2023 Friday

Section: NANOTECHNOLOGY - NANOPOROUS

Length: 611 words

Body

2023 JUN 30 (NewsRx) -- By a News Reporter-Staff News Editor at Nanotech Daily -- Fresh data on Nanotechnology - Nanoporous are presented in a new report. According to news reporting originating in Sichuan, People's Republic of China, by NewsRx journalists, research stated, "Water vapor sorption in nanoporous media with complex pore structures, like shale, is not well understood. To address this, a pseudopotential lattice Boltzmann method (LBM) is developed to investigate water sorption behavior."

Funders for this research include National Natural Science Foundation of China (NSFC), China Postdoctoral Science Foundation, Sichuan Science andTechnology Program, Science and Technology Cooperation Project of the CNPC-SWPU Innovation Alliance, Mucrock Research Consortium Laboratory at the ***Bureau of Economic Geology***, Jackson School of Geosciences, Nanogeosciences laboratory, University of Texas at Austin.

The news reporters obtained a quote from the research from Southwest Petroleum University, "The LBM model incorporates long-range molecular forces using a modified Shan-Chen model based on the Carnahan-Starling equation of state. The simulation results show that the presence of water films in nano -pores can create a liquid pressure difference of up to 100 MPa between confined and free states. The adsorption theories based on simple pore shapes are not applicable to nanoporous systems with complex pore geometries. Additionally, when the relative humidity exceeds 1, water vapor condenses inside hydrophobic nanostructures while being attracted by neighboring liquid, leading to cluster formation. In water-wet nanoporous media, capillary condensation occurs progressively from small throats to large pores, and the sorption curves vary smoothly with pressure variation. In mixed-wet nanoporous media, the sorption curves exhibit no hysteresis in the early desorption stage, where the adsorption and desorption processes occur in the region around the hy-drophobic particles and are reversible."

According to the news reporters, the research concluded: "Overall, this study provides valuable insights into water sorption behavior in nanopore systems of shale and sets the foundation for modelling liquid-vapor distribution in nanoporous media at the pore scale."

This research has been peer-reviewed.

For more information on this research see: Pore-scale Modelling of Water Sorption In Nanopore Systems of Shale. International Journal of Coal Geology, 2023;273. International Journal of Coal Geology can be contacted at: Elsevier, Radarweg 29, 1043 Nx Amsterdam, Netherlands. (Elsevier - www.elsevier.com; International Journal of Coal Geology - www.journals.elsevier.com/international-journal-of-coal-geology/)

Our news correspondents report that additional information may be obtained by contacting Tao Zhang, Southwest Petroleum University, Natl Key Lab Oil & Gas Reservoir Geol & Exploitat, Chengdu 610500, Sichuan, People's

Republic of China. Additional authors for this research include Shangui Luo, Haoran Hu, Liehui Zhang, Yulong Zhao, Hong Zhou, Jing Li and Farzam Javadpour.

The direct object identifier (DOI) for that additional information is: https://doi.org/10.1016/j.coal.2023.104266. This DOI is a link to an online electronic document that is either free or for purchase, and can be your direct source for a journal article and its citation.

Keywords for this news article include: Sichuan, People's Republic of China, Asia, Emerging Technologies, Nanoporous, Nanotechnology, Southwest Petroleum University.

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