**Engineering - Chemical Engineering; Reports on Chemical Engineering from China University of Petroleum (East China) Provide New Insights (Competitive Adsorption of Methane and Ethane In Montmorillonite Nanopores of Shale At Supercritical Conditions: a Grand Canonical Monte Carlo ...)**

603 words
14 June 2019
Chemicals & Chemistry
CHEMEC
2806
English


2019 JUN 21 (VerticalNews) -- By a News Reporter-Staff News Editor at Chemicals & Chemistry -- Investigators publish new report on Engineering - Chemical Engineering. According to news reporting out of Qingdao, People's Republic of China, by VerticalNews editors, research stated, "Because ethane acts apart from methane as a significant component in shale gas, knowledge of the competitive adsorption behavior of methane and ethane in shales, primarily under supercritical conditions, is crucial to understanding the fundamental mechanisms governing fluid storage, transport, and hydrocarbon production. Using grand canonical Monte Carlo simulations, we studied the adsorption behavior of single and binary mixtures of methane and ethane in montmorillonite slits having apertures ranging from 1.1 to 3.0 nm, for pressures up to 40 MPa over a temperature range of 333-393 K.

The dependences of adsorption isotherms and selectivity on pore size, pressure, temperature, fluid composition, and water content were examined."

Funders for this research include National Program for Fundamental Research and Development of China, National Natural Science Foundation of China, Program for Changjiang Scholars and Innovative Research Team in University, National Postdoctoral Program for Innovative Talents, Natural Science Foundation of Shandong Province, China Postdoctoral Science Foundation, Postdoctoral Innovation Special Funds of Shandong Province, Qingdao Postdoctoral Applied Research Project, Fundamental Research Funds for the Central Universities, 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), "With increasing pressure, the selectivity of ethane relative to methane decreases and tends to approach a constant smaller than unity, indicating that the adsorption propensity of ethane fails at higher pressures. The weaker interactions among adsorbate molecules, posterior adsorption saturation, and smaller molecular size of methane lead to its higher adsorption affinity at elevated pressures. Enlarging the pore or increasing the water content suppresses the selectivity of ethane over methane; selectivity decreases more steeply with pressure at lower temperatures. While there is only negligible selectivity variation with fluid composition at low pressures, the preferential adsorption of ethane at high pressures is facilitated by decreasing its mole fraction in the bulk fluid. We also discussed the implications of our work on shale gas exploitation."

According to the news editors, the research concluded: "This study provides better insight into the storage mechanisms of shale gas and sheds light on the reliable estimation of gas-inplace and, more generally, competitive adsorption of mixtures in nanoporous materials."

For more information on this research see: Competitive Adsorption of Methane and Ethane In Montmorillonite Nanopores of Shale At Supercritical Conditions: a Grand Canonical Monte Carlo Simulation Study. Chemical Engineering Journal, 2019;355():76-90. Chemical Engineering Journal can be contacted at: Elsevier Science Sa, PO Box 564, 1001 Lausanne, Switzerland. (Elsevier - www.elsevier.com; Chemical Engineering Journal - www.journals.elsevier.com/chemical-engineering-journal/)

Our news journalists report that additional information may be obtained by contacting S. Wang, China University of Petroleum East China, School of Petroleum Engineering, Qingdao, People's Republic of China. Additional authors for this research include Q.H. Feng, F. Javadpour, Q.H. Hu and K.L. Wu.

Keywords for this news article include: Qingdao, People's Republic of China, Asia, Chemical Engineering, Engineering, Alkanes, Ethane, Methane, China University of Petroleum (East China).



Document CHEMEC0020190614ef6e0018o