

Review of current results obtained in the computational study of hydrocarbons phase and transport properties in nanoporous structures

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Abstract

Comprehensive understanding of both fluid phase equilibrium and transport properties in nano-scale structures is of a great importance for many scientific and technical disciplines, especially for petroleum engineering considering the hydrocarbons behavior in complex shale formations. Recent estimations showed that the significant amount of resources are trapped inside the organic matter and clays, which has extremely low permeability, nano-scale pore throat diameter, and have great economic potential. The research of the processes connected with these deposits is necessary for both evaluations of petroleum reservoir deposits and hydrodynamic simulators. This presentation will offer general overview of the main simulation results of modeling (and corresponding problems) the behavior of gas/liquids under confinement conditions, namely hydrocarbons in shale formations, and current understanding of such phenomena. In addition to the key effects, which different research groups obtained and which have to be taken into account during the creation of reservoir simulation software, the list of methods will be briefly covered. Such software is in great demand and must meet the challenges of shale and tight gas formations.