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Oil & Gas 2018 &
Petroleum Engineering 2018, Volume 2
DOI: 10.4066/2591-7331-C2-006

Joint Event

International Conference on

Petroleum Engineering, Oil and Gas

December 06 -07, 2018 | Dubai, UAE

A novel thermochemical model for nano materials and its applications in the petroleum industry

M R Islam
Emertec R&D Ltd., Canada

Information age marks revolutionary changes in all aspects, but most notably in the domain of nanotechnology. The technological revolution involves Nano materials, engineered or otherwise, that have great mechanical stability, high thermal conductivity, large current carrying ability, and tremendous flexibility in terms of compatibility with other materials. Because all mathematical models of Nano materials use the same theories (ranging from sub-atomic to macro- through molecular scale), conflicting predictions of macroscopic properties of Nano materials emerge. These contradictions have been dealt with dogmatic alterations of the governing equations, often with problematic scientific explanation. However, in this paper such contradictions are erased by starting with theories that do not invoke spurious assumptions. Spurious assumptions are removed at a fundamental level, thereby making atomic structure models consistent with macroscopic models. An immediate outcome of this approach is the elimination of two different governing equations for mass and energy balance. Consequently, there is no longer a requirement to characterize forces as gravitational, electromagnetic, and nuclear. Also rendered redundant are the concepts of molecular forces, lattice energy and its relations to properties of solid, dipole-dipole forces, London dispersion forces, van der Waal's forces, bonds, and others. By using a consistent model throughout, the need to have these notions as well as quantum mechanical narration through perturbation theory, super molecular modeling and others is avoided. The resulting model describes properties of both conventional metals and others, including semiconductors. Because the entire memory of a material is considered distinctly different features emerge for materials subject to Nano-engineering. The model is useful for material characterization as well as for evaluating long-term sustainability. This fundamental modeling approach on technology development leads to the development of an array of new technologies that can have great impacts in the future. These technologies are sustainable and serve as a basis of sustainable oil and gas development. This model provides one with a guideline to study long-term sustainability of novel materials, thereby enacting a protocol for developing sustainable Nano materials.

e: president@emertec.ca

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