

عنوان مقاله:

Enhanced GMA-Based IR EOS for Natural Gas and LNG Thermophysical Properties

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نویسندگان:

Mojtaba Moradian - Department of Chemical Engineering, College of Engineering, Shahid Bahonar University of Kerman, Jomhoori Blvd., Post Code 76175, Kerman, Iran

Sattar Ghader - Department of Chemical Engineering, College of Engineering, Shahid Bahonar University of Kerman, Jomhoori Blvd., Post Code 76175, Kerman, Iran

Abbas Ghareghashi - Department of Chemical Engineering, Engineering Faculty, Velayat University, Iranshahr, Iran

خلاصه مقاله:

The main concern of this paper is to improve the GMA equation of state (EOS), which has been used for the accurate density and thermophysical property calculations for natural gas and LNG. In other words, as the GMA equation of state cannot calculate accurately the density of components in the gas region it is modified in a new form. This new form is capable of calculating the densities of substances in liquid and gaseous state. The GMA equation of state is based on intermolecular potential energy, therefore, the potential energy of the GMA equation of state is corrected and a modified equation of state is obtained which can calculate thermophysical properties in gas as well as liquid regions. The final form of the new equation of state is a regularity between $(\rho - \rho_c)$ and ρ at all temperatures, which is obtained by (9, 6, 3) Lennard-Jones potential. Natural gas density, heat capacity, and second virial coefficient are calculated by a new equation of state which is named the isotherm regularity equation of state (IR EOS). The capability of the new equation of state is examined by comparing its results with experimental data, PR EOS, and GERG EOS from low to high pressures. The new equation of state gives excellent results for calculating the density of natural gas and LNG while it reproduces other thermophysical properties with lower accuracy.

کلمات کلیدی:

Natural gas, LNG, density, isotherm regularity, high pressure, heat capacity

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