

Study of the operating conditions on the deposition of natural gas in pipelines

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Natural gas has presented an increasing participation in the global energy matrix. Thus, attention has turned to this fuel, not only for its potential to provide stability to the electricity sector, through the operation of thermal power plants, but also by numerous environmental benefits that it offers compared to other fossil fuels. However, several problems may occur during transportation of natural gas, such as the formation and deposition of elemental Sulfur (S₈) in pipelines. The formation and deposition of sulfur in pipelines can cause serious consequences for the production, processing, operation and transportation of gas. The formation of the yellow powder, as the elemental sulfur is known, can be influenced by changes in the operating conditions, such as pressure and temperature drop, gas composition and additives used in pipelines. This work aims to understand the mechanisms which control the elemental sulfur and to investigate operating variables which may influence its formation. Results show that nucleation and desublimation are the most likely mechanisms involved in the analyzed process. The construction of the natural gas equilibrium diagram through the use of HYSYS® process simulator has shown that the phase equilibrium is well represented by Peng-Robinson equation of state. In general, the amount of deposited sulfur can be determined by analyzing the phase equilibrium diagram for a specific gas composition and under different operating conditions. Therefore, it is possible to propose solutions to reduce or eliminate its formation inside pipelines.

Biography

Luiz Carlos L. Santos has a bachelor's degree in Chemical Engineering from the Federal University of Rio Grande do Norte - Brazil (1999), a master's in Chemical Engineering (2002) from the same university and a Ph.D. in Chemical Engineering from The University of Manchester, United Kingdom (2007). He has experience in Chemical Engineering with an emphasis in Oil and Gas. His research interests cover the following subjects: petroleum, biofuels, surfactants, microemulsions, adsorption, catalysis and ceramic membranes. Dr. Santos is a member of the Society of Petroleum Engineering

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