U.M. Nour, S. Awad***

Use of Ceramic Materials for the Adsorptive Storage of Natural Gas – a Review, Part 2

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THE AUTHOR

The main author, **Dr. Usama Mohamed Nour El-demerdash**, graduated with a degree in chemical engineering from Minia University, Minia, Egypt, in 1997. He received an MSc in 2002 and his PhD in 2008 from the same university. His recent research areas include gaseous fuel storage (e.g., natural gas, hydrogen), LNG technology development, and gaseous phase processing and separation. He has 11 years of experience in research as well as 3 years of experience in teaching. He is senior lecturer in the chemical engineering department of the Universiti Teknoligi Petronas, UTP, Kuala Kangsar, Malaysia.

ABSTRACT

Natural gas currently is gaining a worldwide acceptance as an economical fuel for vehicles and other applications. Even from the environmental point of view, natural gas performs better than gasoline and diesel. However, the storage of natural gas is considered one of the major bottlenecks toward its widespread application. The adsorptive storage of natural gas (ANG) is a promising alternative to the traditional, expensive storage by compression [i.e., compressed natural gas (CNG)]. However, ANG suffers from many techno-economic problems. In many countries (e.g., USA, China), a large effort has been made toward the replacement of high-pressure compression by an alternative method of storage suitable for working at pressures up to 500 psi (3.4 MPa). This upper limit of pressure easily can be achieved with a single-stage compressor. Alternatively, the vehicle can be refueled directly from a high-pressure natural gas pipeline. In this way, a significant decrease in the capital and operating costs of compression stations can be achieved. Due to its relatively low pressure, ANG obviously has some advantages according to weight, shape, safety, and costs of the storage vessel. In the future, ceramic adsorbent materials such as silica gel, activated alumina, zeolite, or silicon carbide may play an important role in ANG technology. In this review, a comparison of activated carbon as a traditional adsorbent as well as new ceramic adsorbents is discussed for the storage of natural gas.

KEYWORDS

adsorbed natural gas, ANG, compressed natural gas, CNG, nanoporous activated carbon

Interceram 59 (2010) [5]