Synthesis of polymer coated iron oxide nanoparticles as gas hydrate inhibitor

Yeon Won Bae, In Woo Cheong*, Kyu Chul Shin*

Department of Applied Chemistry, Kyungpook National University, 80 Daehak-ro, Buk-gu, Daegu, South Korea

To harvest natural gas from deep sea, drilling with long pipelines is one of the most highly used methods. However, the contact between methane gas and seawater while transporting natural gases through flowlines induces gas hydrate formation that causes blockage of flowlines, and which has been an endemic problem. To prevent or delay the gas hydrate formation, poly(t-butylacrylamide-co-N-isopropylacrylamide) [P(tBAAm-co-NIPAAm)] coated iron oxide nanoparticles (IONPs) was tested as a kinetic hydrate inhibitor. The IONPs makes possible to collect after harvesting of natural gas using magnet. In contrast to traditional kinetic inhibitors, this type of inhibitor can be recyclable or reusable. The IONPs were synthesized by thermal decomposition method and P(tBAAm-co-NIPAAm) were synthesized by reversible addition fragmentation chain transfer (RAFT) polymerization. P(tBAAm-co-NIPAAm) coated IONPs were characterized using Fourier transform infrared spectroscopy (FT-IR) and transmission electron microscope (TEM). Performance of P(tBAAm-co-NIPAAm) coated IONPs as a gas hydrate inhibitor was investigated in a high pressure autoclave reactor system. This work was supported by the Ministry of Trade, Industry and Energy (No. 10014338).

References


Biographic Details

Name: Ye Won Bae
Title: Synthesis of polymer coated iron oxide nanoparticles as gas hydrate inhibitor
Affiliation, Country: Kyungpook National University, South Korea
Phone: +8210-3068-7064 Fax: +8253-950- E-mail: asd706457@gmail.com
Research interests: polymer, nanoparticles, hydrate inhibitor