Kang Seok Go et al., J Pet Environ Biotechnol 2016, 7:3 (Suppl)
http://dx.doi.org/10.4172/2157-7463.C1.017

Effect of surfactants on asphaltene behaviors in the solvent deasphalting system

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Unconventional resources, such as coal tar, bitumen, various type of residue from refineries have a potential to increase a value-up of itself with a variety of upgrading processes. One of those processes is a solvent deasphalting which is a conventional proven technology based on the solvent extraction. However, it still makes a large portion of operating cost for refinery due to recovery of solvent. Therefore, effect of surfactants on asphaltene behaviors in the solvent deasphalting system was investigated to reduce the usage of solvent in this study. Athabasca bitumen and normal paraffin (nC5~nC7) were used as a feedstock and solvent, respectively. And ionic surfactants as additives were used. As results, it was found that some surfactants make a different degree of accumulation between asphaltenes at the same experimental condition. It was also appeared to be different yields and properties between DAO and Pitch as well. The reason for those differences would be expected to be surface modification of asphaltene with surfactants and it was quantified by electrokinetic properties of asphaltenes (Zeta potential: 0~+-80 mV). From this study, it was found that surfactants can change the surface electrokinetic property of the precipitated asphaltene molecules so that the extraction performance maintains a same level at low solvent to oil ratio condition. Therefore, it would be expected to have a potential to reduce the amount of solvent used at solvent deasphalting process.

Biography

Kang Seok Go has completed his PhD from Korea Advanced Institute of Science and Technology, Daejeon, Korea in 2010. He had an experience in refining area at SK Innovation Global Technology as a Senior Researcher until 2014. Now he is working at KIER and KRICT focusing on the research of heavy oil upgrading based on hydroprocessing and fluid catalytic cracking process.

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