

## **Selection of Effective Solvents for Extraction of Naphthenic Acids from Crude Oil**

Chan Woong Yoon<sup>S</sup> and Sung Shin Kang

*Department of Chemical and Biological Engineering, Korea University, Seoul, Korea*

Hwayong Kim

*School of Chemical and Biological Engineering, Seoul National University, Seoul, Korea*

Jeong Won Kang<sup>C</sup> and Dae Ryook Yang

*Department of Chemical and Biological Engineering, Korea University, Seoul, Korea*

*jwkang@korea.ac.kr*

Low-quality crude oil can be upgraded to high quality by removing naphthenic acids which may cause corrosion of equipment and deactivation of catalysts in cracking units. Previous studies show that techniques such as neutralization, esterification, and decarboxylation can be applied to remove naphthenic acids. However, these methods cause other problems such as formation of naphthenic salts/water emulsions and requirement of catalysts with harsh reaction condition. In this study, solvent extraction method was investigated and solvents with high extraction capability, proper physical properties was to be sought. For solvent screening, computer tools such as TDE 8.0 (NIST), ProCAMD (Technical Univ. of Denmark) and COSMOtherm (COSMOlogics GmbH) were used to scan over the list of solvent candidates. After selection of a few solvent candidates, extraction performances were compared by extraction experiment using pseudo-crude oil mixtures. Pseudo-crude oil mixtures were prepared by adding predetermined weight of naphthenic acid to diesel oil. The prepared mixtures were extracted using selected solvents for 2 hours at the temperature of 333.15 K and atmospheric pressure. The performances of solvents were evaluated by acidity determined from titrations of extracted pseudo crude oil. The results shows that several candidate solvents can remove naphthenic acids to commercially meaningful level.