Synthesis of Molybdenum Precursor for Hydrocracking of Heavy oil

Seok-Hwan Son[1], Byeong-Min Choi[1], Seung-Min Lee[1], Ji-Hyun Shim[1], Chul-Wee Lee[2], Sun-Yeong Park[2], Min-Chul Chung[1,*]

[1]*Department of Chemical Engineering, Sunchon National University, Sunchon, Jeonnam, 540-742, Korea*

[2]Division of Green Chemistry & Engineering Research, *Korea Research Institute of Chemical Technology, Dajeon 305-600, Korea*

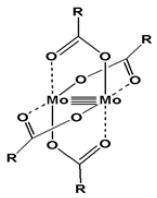
*E-mail: mchung@sunchon.ac.kr

Conventional oil's capacity is just 30% in total and that source will probably be exhausted in the near future. Over the last few decades, interest in unconventional oil has been on the rise. Processes to convert unconventional oil especially heavy oil into better quality products such as liquid products are widely investigated. One of these methods is the slurry -phase hydrocracking process.[1]

In the slurry-phase hydrocracking process, catalyst can be divided into two types: heterogeneous solid powder catalysts and dispersed catalyst. A heterogeneous solid powder catalyst involves a system in which the catalyst and reactants are in different physical phases.4 When the reaction occurs, the reactant has high molecular weight deposits on the active sites of catalyst and blocks the pores; leads to shortening of the catalyst's lifespan and an increase in the pressure drop because of the formation of larger number of solid particle.

A dispersed catalyst has been developed to solve those problems. It consists of the two Dispersed catalyst precursor types: a water-soluble dispersed catalyst precursor and an oil-soluble dispersed catalyst precursor. Generally, the oil-soluble catalyst precursor is more expensive than the water-soluble catalyst precursor. However, the water-soluble dispersed catalyst precursor has lower catalytic activity due to the fast evaporation of water and agglomeration of the precursors.[2~5] The oil-soluble dispersed catalyst precursor has uniformly dispersed. As the results suppress the recidue, increase total conversion and enhance quality. Therefore, we synthesized oil-soluble dispersed molybdenum precursor.

In order to determine chemical structure of Synthesized molybdenum precursors, $^{1}H(^{13}C)$-NMR, EA and ICP were used pyrolysis properties were measured TGA. The molybdenum precursors was used for Hydrocraking of Vacuum Residue(VR).



Dimer Complexes	R
Molybdenum Butanoate (1)	$(CH_2)_3CH_3$
Molybdenum Hexanoate (2)	$(CH_2)_5CH_3$
Molybdenum Nonanoate (3)	$(CH_2)_8CH_3$
Molybdenum Decanoate (4)	$(CH_2)_9CH_3$
Molybdenum Undecanoate (5)	$(CH_2)_{10}CH_3$

Fig.1 Carboxylate Molybdenum Complexes

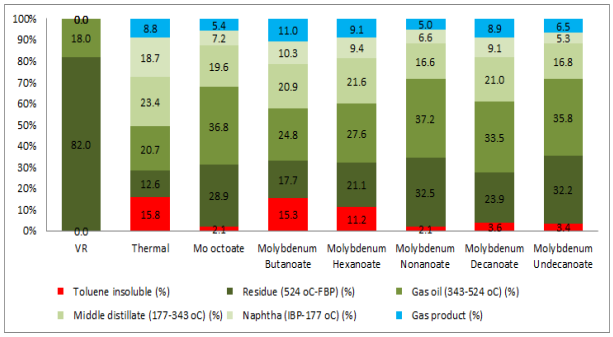


Fig.2 Hydrocracking, Mo carboxylate (100 ml reactor, 20 g VR)

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