An efficient catalysts grading technology for hydrocracking light cycle oil to high-octane gasoline

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Abstract

Naphthalene and tetralin hydrocracking behaviors were investigated over NiMo and CoMo catalysts. The results showed that CoMo catalyst with high concentration of S-edges could hydrosaturate more naphthalene to tetralin but exhibit lower yield of high-value light aromatics (carbon numbers less than 10) than NiMo catalyst. NiMo catalyst with high concentration of Mo-edges also presented a higher selectivity to convert naphthalene to cylanes than CoMo catalyst. Subsequently, the naphthalene and LCO hydrocracking performances were also investigated over different catalysts systems. It showed that the naphthalene hydrocracking conversion and the yield of light aromatics for CoMo-AY/NiMo-AY grading catalysts were higher than NiMo-AY/CoMo-AY grading catalysts at same condition. A stepwise reaction principle was proposed to explain the high-efficiency of CoMo-AY/NiMo-AY grading catalysts. Finally, the LCO hydrocracking evaluation results confirmed that CoMo-AY/NiMo-AY catalysts grading system with low carbon deposition and high stability was more efficient to convert LCO to high-octane gasoline.

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