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## Catalysis in Petroleum Coking

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### ABSTRACT

The petroleum industry is challenged with the processing of present heavy crudes caused by high composition of sulfur and metals, which lead to a higher yield of unfavorable bottom product as vacuum residue. Vacuum residue is the least valuable fraction of four, such as saturates, aromatics, resins and asphaltenes. However, it can be upgraded to recover more valuable products such as light hydrocarbons. The Delayed Coking process is going to be used to transform the vacuum residue at different experimental conditions. First of all, the behavior of the vacuum residue needs to be analyzed with no additions in feedstock. Secondly, the vacuum residue can be mixed with unhydrogenated and hydrogenated light gas oil at different concentrations. Finally, the addition of different catalysts at various concentrations could be another method to achieve high yield of the desired product. Expected experimental conditions are 475°C for reactor temperature and bimetallic or trimetallic catalysts for the delayed coking process. In this research, 3 different catalysts will be tested in several proportions with respect to the weight of the feedstock material. The recommended feed concentration of light gas oil depends on the molecular structure of the vacuum residue and can be determined only by actual experiment. Based on these experimental conditions, a conclusion about the yield of the light hydrocarbons and ways to improving the process can be drawn.

### KEYWORDS

Heavy crude, vacuum residue, delayed coking, light gas oil, heavy gas oil, hydrocarbons, catalysis in petroleum coking.

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