Hydrocracking: converting Vacuum Residue in Naphtha and Diesel

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1. **Theme description**

In the refinery sector, both the fuel and the feedstock market as well as the more stringent environmental regulations are exacerbating the need of maximizing the residue conversion to distillates. In particular, while the distillate fuel demand (gasoline, diesel) is still increasing, the demand of residue fuel oils is about to fall sharply.

Compared with traditional technologies, the present refineries face several challenges because of the presence of crude oils characterized by high content of aromatics, acids, metals and nitrogen, therefore putting more pressure on the hydrocracking and hydrotreating processes that have to handle a low quality feedstock without significant loss of yield or efficiency[1].

The Hydrocracking (HC) process is able to remove the undesirable aromatic compounds from petroleum stocks producing cleaner fuels and more effective lubricants. In other words, the main application is to upgrade vacuum gas oil alone or blended with other feedstocks (light-cycle oil, deasphalted oil, visbreaker of coker-gas oil) producing intermediate

distillates (naphta, jet and diesel fuels), low-sulfur oil and extra-quality FCC feed. HC works by the addition of hydrogen and by promoting the cracking of the heavy fractions in lighter products. With reference to Figure 1, HC globally involves the catalytic cracking (end other micsplitting of a C-C bond) and the addition of hydrogen to the C = C bond (exothermic).

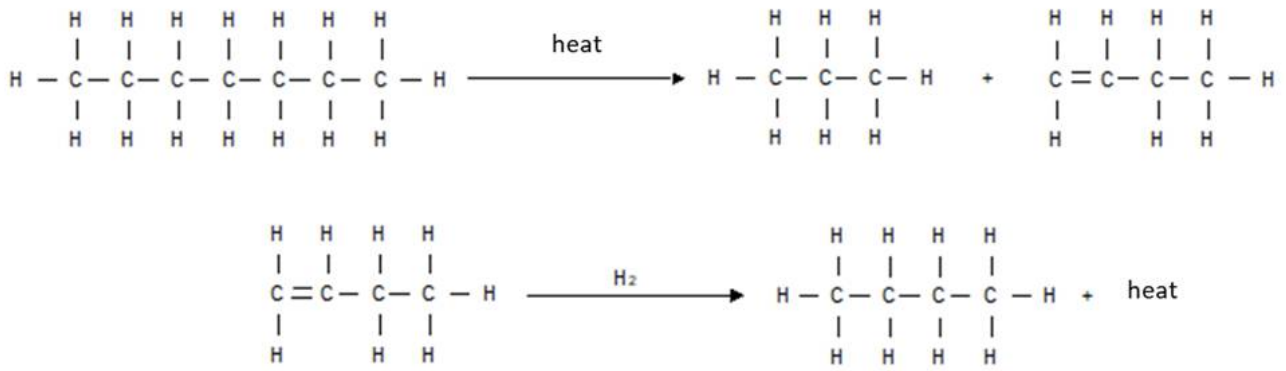

Figure 1: Reactions of cracking and hydrogen addition during hydrocracking

[1]Shell Global SolutionsNEXT-LEVEL HYDROCRACKER FLEXIBILITY UNLOCKING HIGH PERFORMANCE IN TODAY'S TURBULENT MARKETS. www.shell.com/globalsolutions