FCC ADDITIVE i-MAX- ZSM-5 ADDITIVE

Background

For overcoming the limitations in FCC catalysts in producing LPG beyond certain limit, the additives made with ZSM-5 zeolite, are in practice from late 80s. These additives are available with zeolite content ranging from 12-40 wt%. However, commercial additives do have limitation in upgrading of bottoms beyond a certain limit and in spite of having higher zeolite content, don't produce adequate LPG rich in propylene proportional to the zeolite content.

Additive Description

i-MAX formulation were developed with judicious combination of acidic and basic phosphates, "Zeolite stabilization technology" and silica-alumina matrix leading to new products named as:

- ✓ i-MAX Premium
- ✓ i-MAX Supreme
- ✓ i-MAX Ultra

These products have superior performance characteristics and can be chosen depending on refinery specific operational requirements.

Salient Features

- Highest LPG yield per unit zeolite content.
- Lower undesired heavy end hydrocarbon yield.
- Enhanced gasoline octane number.
- Incremental LPG yield by 2.5 wt%, 3.38 wt% and 6.2 wt% with reduction in Bottom yields by 0.5wt%, 0.7 wt% and 0.2 wt% respectively for additive i-MAX Premium, i-MAX Supreme, i-MAX Ultra.
- Enhanced propylene yield by about 3-4 wt%.
- Superior attrition index and excellent other physical properties.

Commercial performance

- Superior performance than commercially available products.
- Prestigious NPMP award for commercialization of indigenous ZSM-5 additive technology.

FCC ADDITIVE INDVi– METAL TRAP

Background

IndianOil R&D has developed & commercialized a novel metal passivation additive named IndVi for handling heavier hydrocarbons feedstock (high CCR, Ni &V) in RFCC unit.

Additive Description

IndVi can overcome the limitations of existing metal passivation additives with a single component, and also handle higher metals. The additive has been prepared from proprietary in-house developed raw materials with tailored composition.

Salient Features

- Reduces dense bed temperature due to lower coke make & increases catalyst circulation rate.
- Reduces CLO / DCO yield with the increase in TCO yield.
- Enhances unit throughput.

Commercial performance

The additive has been successfully scaled up, commercially proven and following benefits were realized during trial run:

- Ability to process additional heavy feedstock thereby increasing unit throughput.
- Increase in TCO yield with corresponding decrease in gasoline yield as per the refinery objective.
- In spite of higher VR addition rate and higher through put, similar CLO yield could be maintained with lower Regenerator dense bed temperature (by 7°C).
- The additive performance has been commercially validated with considerable value addition to the refinery.

DIESEL HYDRODESULFURIZATION/HYDROTREATING CATALYST

Background

Hydrotreating technologies employ robust high-performance catalysts, which can produce ultra low-sulfur diesel (ULSD) meeting the required cetane and other quality criteria. Such catalyst recipes are well guarded and available only from selected commercial catalyst suppliers.

IndianOil R&D's Diesel Hydrodesulfurization/ Hydrotreating Catalyst, INDICAT-DH-IV, is suitable for production of diesel with 10-50 ppm sulphur at appropriate operating conditions. The commercial operation of the catalyst is successfully established through plant demonstration in one of Indian Refinery (CPCL) and is in operation since June 2009.

Catalyst Description

IndiCAT (NiMo & CoMo based) catalyst is 1.2 mm dia trilobe extrudate. The catalyst is designed for ultra deep desulfurization of middle distillates. The highly dispersed active components and tailored support properties enables high intrinsic activity of the catalyst.

Salient Features

- Novel high active Ni-Mo & Co-Mo catalyst for middle distillates.
- Optimal and efficient promoter system for high intrinsic activity.
- Nano size high active Type-II sites
- Optimized physico-chemical characteristics.
- High resistance against deactivation.
- Consistent quality of manufacturing by novel preparation approach.
- Good mechanical properties suitable for commercial utilization.

Commercial performance

- Easy start-up and activation
- Consistent sulfur reduction from 1.71 w% in the diesel to < 35 ppmw at moderate operating conditions.
- 10 ppmw sulphur by process parameter optimization.
- Diesel Cetane improvement even at moderate pressures of 50-55 bar.
- Flexibility for use in Vacuum Gas Oil desulfurization with over 90% sulphur reduction.
- Robustness of the catalyst to withstand changes in the operational severity.
- Lower deactivation rate and increased catalyst life.

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