

Waste catalysts for waste polymer.

ABSTRACT

Catalytic cracking of high-density polyethylene (HDPE) over fluid catalytic cracking (FCC) catalysts (1:6 ratio) was carried out using a laboratory fluidized bed reactor operating at 450 C. Two fresh and two steam deactivated commercial FCC catalysts with different levels of rare earth oxide (REO) were compared as well as two used FCC catalysts (E-Cats) with different levels of metal poisoning. Also, inert microspheres (MS3) were used as a fluidizing agent to compare with thermal cracking process at BP pilot plant at Grangemouth, Scotland, which used sand as its fluidizing agent. The results of HDPE degradation in terms of yield of volatile hydrocarbon product are fresh FCC catalysts steamed FCC catalysts used FCC catalysts. The thermal cracking process using MS3 showed that at 450 C, the product distribution gave 46 wt% wax, 14% hydrocarbon gases, 8% gasoline, 0.1% coke and 32% nonvolatile product. In general, the product yields from HDPE cracking showed that the level of metal contamination (nickel and vanadium) did not affect the product stream generated from polymer cracking. This study gives promising results as an alternative technique for the cracking and recycling of polymer waste.

Keyword: Catalysts; Fluid catalytic cracking; Fluidization; Polymers.