Structural change of fluid catalytic cracking catalysts study incorporate with coke characterization formed in heavy oil volatilization/decomposition

Ye Shui Zhang, Paul R. Shearing, Dan J. L. Brett
Electrochemical Innovation Lab (EIL), Department of Chemical Engineering, University College London, Torrington Place, London, WC1E 7JE

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I. Abstract Body (up to 250 words)

Porous structure change of catalyst and coke formation from feedstock on fluid catalytic cracking (FCC) catalyst have studied by a more comprehensive set of analyses, include 2D, 3D analyses incorporate with carbon/coke characterization teniques. Carbon/coke formed from a heavy oil volatilization/decomposition with different oil-to-FCC catalyst ratio (1:3, 1:2, 1:1, 2:1 and 3:1) to simulate the aging of FCC catalyst in a continuous oil refinery. Carbon/coke was formed for all used FCC catalyst samples that is generally increases with the increase of oil-to-FCC catalyst ratio. Coke formation has been correlated with the porosity change of the FCC catalyst, that more carbon/coke formed on the FCC catalyst due to the increment of oil-to-FCC catalyst ratio leads to the decrease of total pore volume and surface area. Zeolite is evenly distributed from the FCC catalyst particle centre to the exterior for all pristine and used FCC catalyst particles. The interior porous structure of single FCC catalyst particle is not affected by the coking. However, the exterior porous structure is completely disappear for all used FCC catalyst, that could cause by porous frame collapse and the coking clog the surface pores. The more comprehensive study of the structural change incorporate with the carbon/coke characterisation, which helps to understand the progressive degredation of FCC catalyst caused by porous structure change more in depth. Figure 1 is an example of 3 D tomogram and the radial distribution profiles of pristine FCC catalyst1.

III. Reference:

1. Ye Shui Zhang, Xuekun Lu, et al., Structural change of fluid catalytic cracking catalysts study incorporate with coke characterization formed in heavy oil volatilization/decomposition, Submitted.

IV. Biography:

Dr. Yeshui Zhang is currently a research associate in Department of Chemical Engineering at University College London. She has completed her BSc. from University of Birmingham in 2012 and MSc. (Engineering) from The University of Sheffield in 2013. She finished her PhD in September 2017 in the School of Chemical & Process Engineering at University of Leeds, UK. She has expertise in operation of a novel pyrolysis-gasification reactor, the development and use of catalysts and a wide range of advanced analytical equipment, including Transmission/Scanning Electron Microscopy, X-Ray Diffraction, Thermal Gravimetric Analyser, Raman Spectrometry, Gas Chromatography, X-ray tomography etc.