Abstract

Title: Desulfuration processes in refinery and biorefinery: Insight into the role of catalyst protection by catalytic study in the o-xylene hydrogenation process

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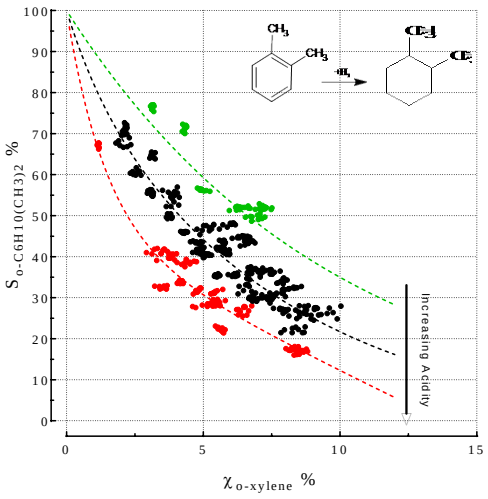
Keywords: Desulfuration catalysts, catalyst protection, deactivation mechanism, acidic properties.

I. Abstract Body

Due to increased environmental concern, the European Union introduced the "zero-sulphur" legislation which limits the sulphur content in gasoline and diesel less than 10 mg/kg, thus requiring the development of new process technologies and improved HDS catalysts for ULSD applications [1-2]. Commercial hydrotreating catalysts, however, are affected by several drawbacks that limit their performance. In particular, the acidic properties of catalyst can promote undesired side reactions, leading to catalyst deactivation by coke formation. Despite intensive efforts devoted to study deactivation phenomena, the nature of acid sites and their role in deactivation by coking is still unclear [3].
On this account, the present study aims to ascertain the influence of the acidity of HDS catalysts on the catalytic pathway in the o-xylene hydrogenation process, as model reaction, and to examine the kinetic mechanism of coking phenomena, aiming also to disclose the key factors governing the catalyst deactivation and to identify new route for catalyst protection [4-5].

II. Image:

Reactivity of different CoMo- and NiMo-based catalysts in the o-xylene hydrogenation.



Therefore, different families of NiMo and CoMo based catalysts have been prepared and tested in the model reaction. The graph reported in the Image clearly points out a linear correlation between the catalyst acidity, the hydrogenation activity and the deactivation by polycondensation (PCP) phenomena. Then, in the light of the results obtained, new protection techniques, based on the use of different protecting agents (i.e. weak Lewis sites inhibitors and carbon-containing protecting molecules), have been investigated, aiming to increase the stability of the catalyst without affecting the reactivity.

III. Reference:

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IV. Biography:

Alessandra Palella received her education at the University of Messina, obtaining M.Sc. in Industrial Chemistry. She has just completed her PhD in "Materials for Health, Environment and Energy", from University of Rome. She is Research Associate at the National Council of Research and she works mainly on the design and development of catalytic materials and processes for energy and environmental applications. She has published more than 10 papers in reputed journals.

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