MODIFICATION OF COMMERCIAL ZEOLITES TO IMPROVE THEIR CATALYTIC PERFORMANCE IN THE ALKYLATION OF BENZENE

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1. INTRODUCTION

Over the last 40 years, CEPSA has developed the most modern technology for manufacturing linear alkylbenzenes (LAB), technology which is at the forefront of the sector. LAB is the most common raw material in the production of biodegradable detergents.

In this work, the catalytic behavior of different modified commercial zeolites on the alkylation of benzene with 1-dodecene has been studied in order to improve their activity and selectivity towards the linear phenyl isomers. In this sense, desilication treatments have been carried out with the objective of increasing the mesoporosity and thus improve the catalytic activity, and passivation treatments have been done with the purpose of improving the catalytic behavior and increasing the selectivity to LAB by neglecting side reactions which could happen on the zeolite surface.

2. EXPERIMENTAL

2.1. DESILICATION TREATMENTS

Desilication treatments result in a larger mesopore and lower micropore volumes. Acidity does not change significantly after the treatment.

2.2. SURFACE PASSIVATION TREATMENTS

Passivation treatments, as a result of silica-coating, reduce the zeolite surface area, especially the mesoporous contribution. Besides, these treatments reduce the total acidity of the catalysts.

3. RESULTS

Catalytic results show the modification in the textural properties barely changes the catalytic activity behaviour. It slightly improves the dodecene conversion due to the diffusion enhance achieved by increasing the mesopore contribution.

Surface passivation treatment barely changes the LAB isomer selectivity distribution.

4. CONCLUSIONS

- Desilication treatment of beta zeolites increases their mesoporosity improving slightly the catalytic activity. Besides, it slight changes the selectivity to bulkier alkylbenzene isomers.
- Surface passivation treatments decrease largely the zeolite acidity reducing significantly the catalytic activity, especially in the case of the faujasite material.

5. REFERENCES