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Investigation and optimization of the n-heptane isomerization reaction over the Pt-Zr-HMS catalysts with RSM method

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Since the isomerization process plays an important role in various industries, increasing the efficiency of these processes is an inevitable necessity [1]. In this research, using platinum catalyst, we tried to obtain the efficiency by changing the numerical value of temperature parameters, weight percentage of zirconium and hydrogen flow. The process of n-heptane isomerization on platinum catalysts with the effect of different numerical values of the following parameters in response surface methodology (RSM) software; T: temperature (200-500 °C), WZ: weight percentage of zirconium (5 to 35%), and TOS: time on hydrogen flow (1-6 h).

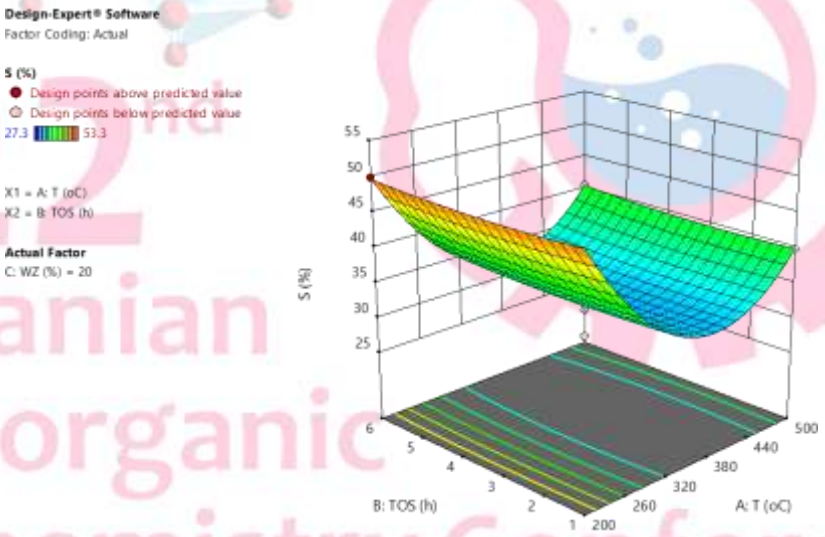


Figure 1. Surface response for the n-heptane isomerization as a function of reaction temperature and time on stream at a weight percentage of zirconium (20%).

As can be seen, the selectivity has a downward trend and then an upward trend. In this reaction, the minimum selectivity is between 320 and 440 °C, and the lowest value (27.3%) refers to 350 °C. At a temperature of 200 to 260 °C, this reaction has the maximum selectivity, which is 55.3%, happened at 200 °C and TOS of 3.5 h. The highest selectivity is related to 200 °C and 3.5 h, and the weight percentage of zirconium is 35% and 5%, respectively.

Keywords: Isomerization, Catalysts, Response surface methodology, Zirconium.

References

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