Response to Reviewer C

We would like to thank the reviewer for careful and thorough reading of this manuscript and for the thoughtful comments and constructive suggestions, which help to improve the quality of this manuscript. The corresponding changes made in the revised paper and summarized in our response below.

Reviewer’scomments:

**Comment 1:** Line 48: what are the general conclusions from these studies? Scientific contribution from the authors study needs to be stressed out.

**Reply:** We have moved the information of lines 46-50 to the next paragraph to reduce ambiguity. We have provided this sentence to show priority of lumped kinetic over microkinetic model in propane aromatization that it is explained in line 51-54.

Presenting a six lumped kinetic model with six reaction steps under catalyst deactivation for propane aromatization is our scientific contribution in this study. It is noteworthy that coke is considered as a lumped component.

**Comment 2:** Lines 83-90: this is not catalyst preparation.

**Reply:** We have moved the information from lines 83-90 to the end of "catalyst performance" section.

**Comment 3:** Why is there a section on catalyst characterization if it is not used anywhere in the results and discussion? This part needs to be reduced or omitted.

**Reply:** We have omitted the result of catalyst characterization from the experimental section and it is moved to the result and discussion section, as suggested.

**Comment 4:** Line 143: equation 3 is redundant.

**Reply:** The equation 3 was deleted in the revised manuscript.

**Comment 5:** Line 146: the model should not be presented in the Results section!

**Reply:** We have removed the model from the result section and it is moved to kinetic model section.

**Comment 6:** Lines 204-206: why was this approach adopted? Needs to be clarified.

**Reply:** We have clarified lines 204-206. The sentence now reads: As product components can bring about coke formation, independent deactivation equation could be used and deactivation order equals 1 was assumed.

**Comment 7:** Lines 243-249: Not clear, needs to be rewritten.

**Reply:** We have modified line 245 to make it clear. The former sentence has been substituted by: By comparing obtained deactivation constant value (Table IV) with Baradaran *et al*.35 results, it can be concluded that increasing of deactivation constant is due to increasing Zn load from 0.4 to 3wt.%.

**Comment 8:** Figure 5: the length of x and y axes should be the same.

**Reply:** The length of x and y axes in Fig.5 have been became the same.

**Comment 9:** The trends presented in the Results should be compared to the existing literature data.

**Reply:** We have compared the obtained trends to the existing literature data. The following sentences are added: The obtained trends in Fig. 6 are similar to the results of Roohollahi *et al*.26 and Choudhary *et al*.37 . The attained trends in Fig. 7 and the results of Choudhary *et al*.38 are in a good agreement. The obtained trends in Fig. 8 and Fig. 9 are close to the results reported in literature. 35

**Comment 10:** The quality of the figures needs to be improved.

**Reply:** As suggested by the reviewer, the quality of the figures has been improved.

**Comment 11:** Equations 24-26: It is not clear what is the source and purpose of these equations.

**Reply:** The source of equations 24-26 has been mentioned in the revised manuscript (reference 38) and their purpose has been explained too. Therefore, the former sentence has been substituted by: According to the positive values of enthalpy changes, these reactions are endothermic.

**Comment 12:** Figures 7-9: the range of y axes in these figures should be revised. Too much empty space is present.

**Reply:** The suggested correction has been made.

**Comment 13:** Nomenclature: all symbols must be accounted for here!

**Reply:** All the symbols have been checked and then we have added TG and DTA symbols in Nomenclature section.

Again, we appreciate all your insightful comments. We worked hard to be responsive to them. Thank you for taking the time and energy to help us improve the paper.

Sincerely,

Seyed Mehdi Alavi

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