Example of a Good Review from a Manuscript Submitted to the *SAE International Journal of Fuels and Lubricants*

Interesting and relevant topic is discussed. The relationship between the amount of ethanol slip and NMOG emissions from the literature for commercial E85 flex-fuel vehicles (manuscript states this is intended application and need) is needed to set-up the relevance of the experimental work presented and the % ethanol that is discussed in the introduction. If ethanol slip only makes up 10% of NMOG, maybe focus on ethanol slip isn't as important. This thought direction should be discussed more thoroughly in the introduction and perhaps in the results section. Make sure to reference the information included when adding this information. Also, a discussion in the results or conclusion section is needed to tie the vehicle work results into the rest of the manuscript.

Regarding the integrity ranking of the manuscript, more discussion about how these results tie into other work in the field. What are the more commonly researched types of HC traps? Is the research presented in this manuscript trying to solve the problem or elucidate the benefits of different components of commonly studied HC traps? Discuss this in the paper. It would also be good to mention other types of aftertreatment research that are exploring the benefits of Pd exchanged zeolites (i.e. passive NOx absorbers (PNAs) and oxidation catalyst).

More thorough descriptions of the materials and tests performed need to be included in the manuscript. Some specific suggests are listed in suggested revisions at the end of this review, including but not limited to more references of other work in the field and presented all the results of the study. If for example, the distribution of products for the rich pre-treated samples or a carbon balance could not or were not done, the authors still need to address the topics rather than omitting them.

The summary/conclusions section should include a short discussion that lays out the importance of these results and how each summary point ties together to show this importance.

Some revisions to manuscript are needed:

- Abstract, 2nd sentence: current wording is confusing; should "aging" be included after "laboratory"?
- Introduction: Lots of facts are presented, but not a single reference is given.
    - Reference: 250C for TWC light-off
    - Reference: 80-90% of emissions from cold-start
    - Reference: E85 + flex-fuel vehicles resulting in 2x NMOG emissions at tailpipe
- Introduction, 3rd paragraph: the term "conventional zeolites" needs to be explained in the manuscript; i.e. What makes them "conventional"? Why?
    - Then explain what about authors zeolites is NOT conventional.
- Experimental, powder sample and aging: a complete manuscript that includes a synthesized material should include more details in the experimental section. Need to include:
    - How long it was mixed
    - How the solvent used for wet impregnation was removed

    - If all solvent was adsorbed into the zeolite than it is not wet impregnation but a level incipient wetness
    - If wet impregnation, what additional solvent was added to the Pd(II) nitrate solution
    - List in this section what the 3 metals are for TWC washcoat (i.e. a (2:47:1) loading of what? Answer to include (Pt:Pd:Rh)?
- Experimental: Need to include how gas composition was measured for both powder testing and vehicle testing
    - Figures suggest (based on labeling) that an MKS FTIR was used….What method?
    - Was FID, NO/NOx analyzer, and FTIR used for vehicle testing
- Experimental, lab reactor testing 1st paragraph: please include in this section how much catalyst samples was used so that gas hour space velocities or equivalent can be determined.
- Experimental, vehicle testing: please give details on how the FTP75 was run. Was it in a chassis lab? Where is lab located: university/company? Was a robot or human drive used?
- Results, powder sample testing no TWC, 2nd paragraph: Need to include comment on carbon balance
- Results, powder sample testing no TWC, 2nd paragraph: sentence start with "According to the Reactions 1 & 2,…." Is it correct dehydrogenation follows a 2 step process in manuscript listed reactions 1 + 2; decomposition is listed as reaction 3 in authors list. Therefore sentence should read "According to the Reactions 1+2 and 3,…"
- Results, powder sample…no TWC: Need to give results of pre-rich treated. Table 6 presents the %ethanol slip but no discussion is given regarding product distribution from TPD.
- Results, Vehicle testing: were these commercial catalysts? What zeolite was this catalyst?
- Results, Vehicle testing: Describe the weighted term in text and as used in Fig 9
    - Are NMOG + NOx only Bag 1 or are the total cold start (Bag 1 + 2) and Hot start (Bag 3 + 4) for complete FTP75 emissions?
- Results, Vehicle testing: For vehicle testing to be included in this manuscript, a paragraph with some correlation or discussion on how this adds to the powder reactor results should be
- Figure 6: Was the 4-modes aging and pretreatment done or was only the pre-treatment done? Authors introduced term "mild aging" that is not explained. Explain in text and figure.
- Figure 7: label temperatures and be consistent with other TPD figures
- Figure 9 (right): Authors need to explain what these error bars represent. Are they min/max values or standard deviation? Also, indicate how many data points were used to get these error bars. Make sure the term “weighted” is explained somewhere.
- Table 1: Column 4 should include the (Pt:Pd:Rh) label.
- Table 2: need to fix Rows 4 and 5 which have the same name. Probably lean pre-treated and rich pre-treated need to be added.”