

Reviewer 2:

Review Report Form

Open Review

☒ (x) I would not like to sign my review report

☐ () I would like to sign my review report

Quality of English Language

☒ (x) I am not qualified to assess the quality of English in this paper

☐ () English very difficult to understand/incomprehensible

☐ () Extensive editing of English language required

☐ () Moderate editing of English language

☐ () Minor editing of English language required

☐ () English language fine. No issues detected

Comments and Suggestions for Authors

The present work describes the current state of knowledge regarding the use of Noble metals catalysts in the process of nitrous oxide decomposition.

The problem of nitrous oxide is still a topical issue, and this work is evidently interesting. Reviews of this type are needed and provide a valuable knowledge base for other scientists, so it seems to interest the readership of Catalysts. Therefore, the manuscript should be published in this Journal.

Based on a literature review (73 items - mainly scientific articles) excluding patent literature and commercial offers, the authors describe and highlight the crucial role of supports, preparation methods, particle size, additives, and impurity gases in catalytic activity.

However, some important issues require broader discussion and/or clarification before publication. Referring to more recent data is necessary because **60 % of the cited**

literature is older than ten years. Take into account that the last five years have been a period of increased research and scientific publications in the area of low-temperature N₂O decomposition.

Response: We would like to thank the reviewer for the valuable comments. Accordingly, we carefully checked the literature again and included quite a number of representative references for all the mentioned noble metals and discussed them in the corresponding places of the revised manuscript. In addition, a few figures were added and several existing references were discussed in a more detailed way. These references have been listed below.

1. Rh-based catalysts (*ACS Catal.* **2022**, *12*, 6325–6333; *J. Rare Earths* Doi: 10.1016/j.jre.2023.01.006; *Eur. J. Inorg. Chem.* **2021**, *23*, 2201–2210; *Catal. Today* **2020**, *355*, 608–619. *Chem. Eng. J.* **2020**, *379*, 122259).
2. Ru-based catalysts (*Sci. Rep.* **2020**, *10*, 21605; *Catalysts* **2016**, *6*, 173).
3. Pd-based catalysts (*Appl. Catal. B* **2020**, *264*, 118501; *Appl. Surf. Sci.* **2020**, *510*, 145349).
4. Pt-catalysts (*Environ. Technol. Innovation* **2022**, *26*, 102344).
5. Au-based catalysts (*ChemistrySelect* **2020**, *5*, 5391–5399).
6. Ir-based catalysts (*Catal. Commun.* **2021**, *149*, 106208; *Catal. Lett.* **2018**, *148*, 341–347).
7. Other related references (*Int. J. Environ. Sci. Technol.* **2022**, Doi: 10.1007/s13762-022-04698-4; *Energies* **2021**, *14*, 6148; *Catal. Surv. Asia* **2016**, *20*, 121–132; *J. Catal.* **2004**, *224*, 252–260; *Chem. Eng. J.* **2023**, *461*, 141958; *Catal. Lett.* **2005**, *99*, 41–44; *Catal. Lett.* **2007**, *113*, 124–129; *Chem. Eng. Res. Des.* **2019**, *141*, 455–463).

After including the above references, figures and more comprehensive discussions, we believe that the revised manuscript has been greatly improved. We sincerely hope that the reviewer could be satisfied with our modifications.

The authors should better justify the advantages of the Noble metals catalysts and also indicate their disadvantages in the N₂O decomposition process. It should be remembered that the purpose of the research is the practical application of "catalysts"

and their implementation in industry. Therefore, reference should be made to this aspect's current state of knowledge.

Response: We would like to thank the reviewer for the valuable comments. Accordingly, a new section ("5. Industrial applications of noble metal catalysts") was added specifically to discuss the disadvantages and practical application issues of noble metal catalysts.

Moreover, a summary is not enough. The last paragraph, "Conclusion", should indicate the review's **conclusions**, exactly what you want to communicate to the reader.

Response: We would like to thank the reviewer for the valuable comments. Accordingly, an independent paragraph, "Although noble metals exhibit good performance in decomposing N_2O at low temperatures, their high costs limit their widespread industrial applications. However, single atom catalysts have recently received significant attention due to their higher utilization efficiency of noble metals, making them a promising research direction for noble-metal-catalyzed N_2O decomposition. In addition, the use of various supports can enhance the dispersion of precious metals, increase oxygen vacancies, and regulate the acid-base properties of the catalysts, thus improving the metal-support interaction and practical application of noble metal catalysts." was added to emphasize the review's conclusions and express future directions to readers, as listed below.

All suggestions and tips are included in the comments in the attached manuscript.

Response: We would like to thank the reviewer for all these valuable comments and suggestions. Accordingly, we attempted to address all these concerns, and the modifications were displayed in the "Track changes" function of the revised manuscript.