For research article

Response to Reviewer 3 Comments

1. Summary

Thank you very much for taking the time to review this manuscript. Please find the detailed responses below and the corresponding revisions/corrections highlighted/in track changes in the re-submitted files.

2. Questions for General Evaluation	**Reviewer's Evaluation**	**Response and Revisions**
Does the introduction provide sufficient background and include all relevant references?	Can be improved	
Are all the cited references relevant to the research?	Yes/Can be improved/Must be improved/Not applicable	
Is the research design appropriate?	Can be improved	
Are the methods adequately described?	Can be improved	
Are the results clearly presented?	Can be improved	
Are the conclusions supported by the results?	Must be improved	

3. Point-by-point response to Comments and Suggestions for Authors

Comments 1: The scope of journal "Metals" is processing, structure and properties or functions of all kinds of metals. Since it is hard to imagine the working conditions for nickel at 3000 K and 500 GPa, it would be useful to provide the suggestion, at least hypothetically, as to where such working conditions could appear.

Response 1: As mentioned in the introduction, Ni is one of the most abundant elements on the Earth, and in geochemistry and geophysics, the EOS of Ni at high pressures and simultaneously high temperatures are necessary, but difficult to obtain due to current high-pressure technology. In this manuscript, the calculated pressures reaching 500 GPa up to 300 K is mainly for the fundamental research.

Comments 2: The goal of work should be clearly stated in the Introduction.

Response 2: Yes, it was added in the revised manuscript (L68-71).

Comments 3: Scientific novelty and practical significance of findings should be clearly

emphasized in Abstract and Conclusions.

Response 3: Yes, they were added in the Abstract and Conclusions.

4. Response to Comments on the Quality of English Language

Point 1:

Response 1:

5. Additional clarifications