Response to the reviewers' comments

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Title: Preparation and Photocatalytic Performance for Degradation of Rhodamine B of AgPt/$Bi_4Ti_3O_{12}$ composites

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Dear Editor,

Thank you very much for your consideration of our manuscript. We would also like to thank the reviewers for their valuable comments and suggestions. According to the reviewers' comments, we have revised our manuscript carefully and the revised manuscript is re-submitted. All the corrected parts are highlighted with a yellow background in the revised manuscript. The detailed responses to your and reviewers' comments are listed in the following pages. We hope that our answers are satisfactory and that the revised manuscript can be accepted for publication. We deeply appreciate your consideration of our manuscript, and we look forward to receiving the comments from you and reviewers.

The following answers written in blue are the response to the questions raised by the reviewers.

The following sentences written in red are added corrections in the revised manuscript according to reviewers' comments.

Reviewer #1:

This article is interesting and they report useful information but lack explanation of the novelty of this study when compared to similar type and $Bi_4Ti_3O_{12}$/Ag_3PO_4 composites.

Response: Many thanks for your appreciation of our work. According to your suggestions, we added the relevant parts in the revised manuscript. All your questions were answered below.

1. The authors should clarify the feasibility and significant novelty compared to the following articles (Zheng, C., Yang, H., Cui, Z. et al. A novel $Bi_4Ti_3O_{12}$/Ag_3PO_4 heterojunction photocatalyst with enhanced photocatalytic performance. Nanoscale Res Lett 12, 608 (2017). Highly Efficient Ag_2O/$Bi_2O_2CO_3$ p-n Heterojunction Photocatalysts with Improved Visible-Light Responsive Activity, Na Liang, Min Wang, Lun Jin, Shoushuang Huang, Wenlong Chen, Miao Xu, Qingquan He, Jiantao Zai, Nenghu Fang, and Xuefeng Qian, ACS Applied Materials & Interfaces 2014 6 (14),

11698-11705, DOI: 10.1021/am502481z; https://doi.org/10.1016/j.seppur.2020.116622; https://doi.org/10.1016/j.apcatb.2020.118876 etc.) which are published the same materials.

Answer: Thanks for your comment. We carefully read the literature you suggested, and we think that no heterojunction was formed when Ag and Pt nanoparticles were loaded on the surface of $Bi_4Ti_3O_{12}$ nanosheets. Under the irradiation of light, electron-hole pairs were generated in $Bi_4Ti_3O_{12}$ semiconductor and the generated electrons migrated to Ag and Pt nanoparticles, leaving photogenerated holes in $Bi_4Ti_3O_{12}$. As a result, a Schottky barrier can be formed on the metal-semiconductor interface. Therefore, the separation of electron-hole pairs was accelerated by Schottky barrier, but not heterojunction. Theoretically, heterojunction was always formed between different semiconductors with different bandgap energies. We are so sorry for misquoting the concept of "heterojunction" in the previous manuscript, and we have deleted the word "heterojunction" in the revised manuscript.

Compared the present $AgPt/Bi_4Ti_3O_{12}$ composite photocatalysts with $Bi_4Ti_3O_{12}/Ag_3PO_4$ heterojunction photocatalyst and $Ag_2O/Bi_2O_2CO_3$ p-n heterojunction photocatalysts, the photocatalytic mechanism is different. For the present $AgPt/Bi_4Ti_3O_{12}$ composite photocatalysts, the improvement in separation of photogenerated electron-hole pairs was accelerated by Schottky barrier; while heterojunction dominated the separation of photogenerated electron-hole pairs for the $Bi_4Ti_3O_{12}/Ag_3PO_4$ and $Ag_2O/Bi_2O_2CO_3$ heterojunction photocatalysts.

In addition, the suggested work (Zheng, C., Yang, H., Cui, Z. et al. A novel $Bi_4Ti_3O_{12}/Ag_3PO_4$ heterojunction photocatalyst with enhanced photocatalytic performance. Nanoscale Res Lett 12, 608 (2017)) was cited in the revised manuscript to support the corresponding content.

The following parts were revised in page 1, line 2-4 in the revised manuscript.

Preparation and Photocatalytic Performance for Degradation of Rhodamine B of $AgPt/Bi_4Ti_3O_{12}$ composites.

The following parts were revised in page 2, line 53 in the revised manuscript.

$Bi_4Ti_3O_{12}$ can respond to visible light since its bandgap is about 2.9 eV, and shows strong photocatalytic activity for the removal of organic pollutants[14-16].

In addition, following references were added in page 13, line 400-401 in the revised manuscript.

[16] Zheng, C.X.; Yang, H.; Cui, Z.; Zhang H.M.; Wang X.X. A novel $Bi_4Ti_3O_{12}/Ag_3PO_4$ heterojunction photocatalyst with enhanced photocatalytic performance. *Nanoscale Res Lett*. **2017**, 12, 608.

2. Add error bars to the figure 10-12 for understanding the reproducibility of results.

Answer: Thank you so much for the valuable suggestion, and error bars have been added to Figure

10-12 in the revised manuscript.

Fig 10a was replaced in page 9 in the revised manuscript.

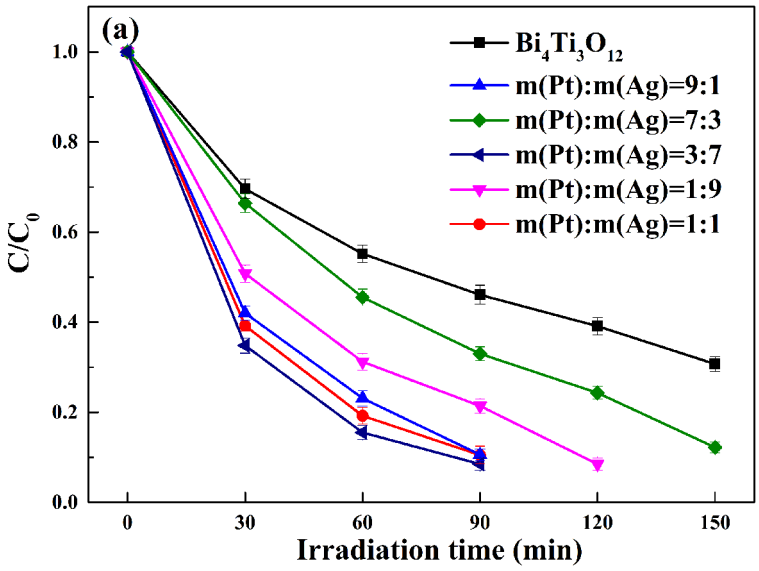

Fig. 10 (a) Photocatalytic activity of pristine $Bi_4Ti_3O_{12}$ and as-prepared $(AgPt)_{0.001}/Bi_4Ti_3O_{12}$ composite photocatalysts prepared by photocatalytic reduction method on the degradation of RhB.

Fig 11a was replaced in page 9 in the revised manuscript.

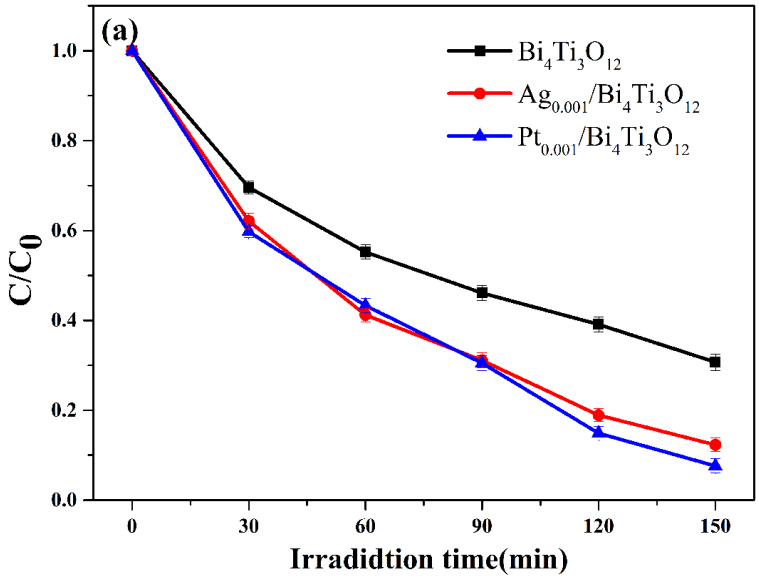

Fig.11 (a) Photocatalytic activity of pristine $Bi_4Ti_3O_{12}$, $Ag_{0.001}/Bi_3Ti_4O_{12}$ and $Pt_{0.001}/Bi_3Ti_4O_{12}$ composite photocatalysts prepared by photocatalytic reduction method on the degradation of RhB.

Fig 12a was replaced in page 10 in the revised manuscript.

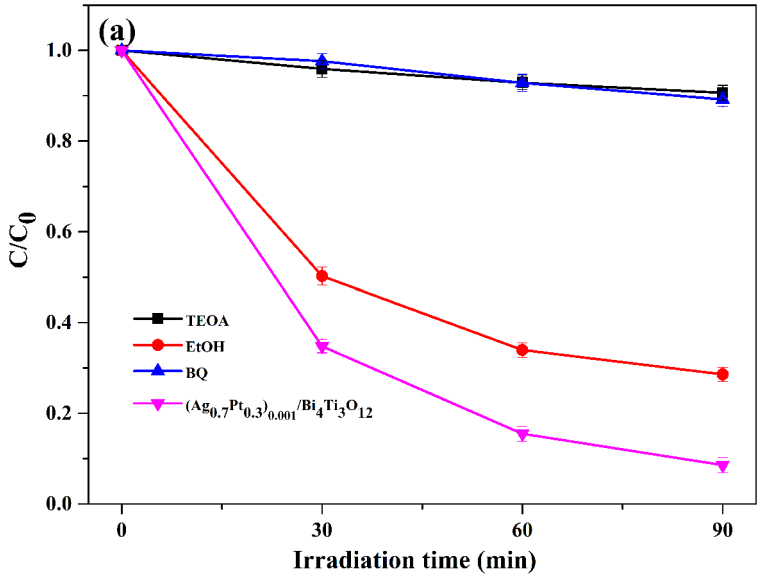

Fig.12 (a-b) Effects of various scavengers on the photocatalytic efficiency of $(Ag_{0.7}Pt_{0.3})_{0.001}/Bi_4Ti_3O_{12}$.