Reviewof Manuscript ID:catalysts-1100837 R1

Title: Gold Nanoparticle-Decorated Bi2S3 Nanorods and Nanoflowers for Photocatalytic Wastewater Treatment

Summary: Authors did not do a good job for revision of their manuscript. They did not pay enough attention to address the reviewer's comments and concerns. Many comments (e.g., comment #1, #2) were not addressed at all. It was also difficult to understand the changes that authors implemented in the revised manuscript since they did not provide detailed responses in the coverletter. Therefore, the authors are recommended to respond each comment with detailed information (highlight line and page number). The reviewer would like to give the authors another opportunity for a through and careful review of the manuscript. The authors should take care of the below comments including the new ones for further evaluation of the manuscript.

Old Comment 1: Following issues still needto be covered-
- L27-orthorhombic phase Bi2S3 parti-.....Still needs to be taken care of
- "...Bi2S3 nanocrystals with 350 nm average length and 65 nm average diameter is initiated as 94..."-Either include standard deviation or provide the range when reporting length and diameter. Authors response: L99:"..Bi2S3 nanocrystals with 350-360 nm average length and 65-70 nm average diameter is ini..."
- "...conductor: A Case Study on Bi2S3 /Bi2WO6, ACS...."-Ref #7–not corrected. As appears now ".....A Case Study on Bi2S3 /Bi2WO6,...."
- ".....application of the prepared nanocomposites147..."-What is meant by "nanocomposites.." in line 169 in revised manuscript.
- "The particles showed 292 extraordinary stability and recyclability..."-What is meant by "extraordinary" here. It's better to avoid such exclusive word if the conclusion is not supported by "extraordinary" data. –The manuscript still contains such word e.g., L28: "The photocatalysts 28
- exhibit extraordinary stability and recyclability...."
- Sample preparation (SEM/TEM etc.) should be elaborated in the instrument section-L309: "...dissolving 1 mg of 309 the materials....." –which materials? Which solution? How did the materials dissolve in toluene? Authors should improve this section. Add sample prep details for other characterization too.

Old Comment 2 was not addressed at all. Authors should take care of this comment.
Introduction is weak. Authors need to cover some aspects of heterostructure semiconducting oxides such as nanorods/nanofibers, nanoparticles/nanorods etc. in photocatalysis. Highlight the importance of various factors including morphology, interface, surface area or physicochemical properties from relevant articles. They need to highlight some notable studies and include recent references in the discussion. Here are some interesting studies on heterostructured photocatalysts. Authors are recommended to cite them in the discussion.

Here some specific comments that need to be addressed as well.
"A significant degradation of organic dye 37 pollutant has not been achieved .....and renewable 39 energy source, is considered to power these processes"-The objectives of these lines are not clear.Again, authors did not address this in their response.
"Despite these advantages of photocatalytic energy .....to deliver the required 48 potential differences for relevant redox reactions."–Should include references. Authors did not address this.
"Common obstacles for the feasible production .....fall below expectation" -It would be great to highlight a few studies instead of saying the above general statement.

Old Comment 3: In response to the comment#3, authors added the following-
L62: "....Though Au-Bi2S3 heteronanostruc-65 tures has been reported for diverse applications [**21-23**], the synthetic procedures poses 66 more difficulty...". However, their statements are vague and does not substantiate the novelty of their studies. Could authors elaborate what sort of difficulty is associated with synthetic procedures in ref#21-23. Also, authors should justify why and/how their proposed method overcome those difficulties if any. It is important to present the hypothesis and motivation of the work considering past research.

Old Comment 4: The synthesized material is crystalline as indicated by the XRD data. What were the crystallite sizes of the synthesized materials? Authors should compare the size obtained from HRTEM with the XRD results. "The sizes were determined by focusing on the (111) plane peaks of the nanoparticles. The XRD diameter size of was determined to be 55 nm and 1.8 μm for BNR and BNF respec-tively, which were in close agreement with the sizes determined by TEM."

Old Comment 5. How did authors optimize the Au in Au-BNF sample? This is not clearly explained.

Old Comment 7: Authors are suggested to point out the reasons for higher photoactivatesof these heterostructure. Perhaps authors could highlight the role of interface to increase the charge separation. Can authors check the influence of these heterostructure morphology in faster charge separation by PL or photocurrent measurement. Photorecombination via PL or photocurrent ?

In response to this comment authors answered –"We also included the role of interfacial chargetransfer in our discussing since it is mostly likely with AuNPs and semiconductor Bi2S3" How did authors justify the interfacial charge transfer? Measurement of PL spectra or photocurrent in heterostructure samples are typical in such claim.

New Comment 1: Authors should pay attention to improve the qualityof the technical writing as many statements are not scientifically sound and present vague meaning. Only a few examples are shown -L115-"The enhanced 115 performance by BNF compared to BNR could probably be due to presence of more active 116 surface for dye degradation."–What is referred by active surface. L232"..he nanostructures alone does not 232 show any obvious change in morphology while the

hybrid showed more shrinkage in the 233 lotus-like flower surfaces" Does it mean the heterostructure sample is not morphologically robust? Why did authors suddenly call the sample as "hybrid"?

New comment 2: Surprisingly,**Figure S6:** SEM image of BNF after degradation experiment appears to be an exact match with a specific portion of the Fig. 2d-SEM images for BNF before photocatalytic test.Part of the Fig 2d perfectly overlap on the Fig. S6! Authors should either justify this or present an original experimental image.