2# Reviewer's comments

Q1: The submitted manuscript describes the procedure to valorize electrolytic manganese anode slime as a catalyst for the advanced oxidation treatment of antibiotics. The paper is well-written, and the presented research is sufficient to prove the concept of this work.

There only few points that authors should improve before publication. What I would like to express is that the subject of this paper is better fitted to the field of circular economy, waste treatment engineering and chemical engineering rather than a nanomaterial development. Therefore, I am not sure if the journal suits this paper.

R1: We appreciate the reviewer's comments. Although our raw materials come from industrial solid waste, we are engaged in the research and development of nano-materials, and the prepared materials are indeed nano-materials, which can be seen in the SEM and HRTEM characterization pictures of materials, and we focus on exploring the catalytic performance of materials and making a series of characterization. Therefore, this work is suitable for this journal.

Q2: The abstract does not mention that the application of this work is for advanced characterization processes and that is not clear from the beginning to the reader.

R2: Thank you very much for your review. We have carefully revised this question, and the revised abstract is located in **line 6-19** of the revised manuscript.

The effects of sulfuric acid concentration, ethanol dosage, liquid-solid ratio, leaching temperature and leaching time on the leaching of manganese from electrolytic manganese anode slime were systematically studied. Under the optimal conditions, the leaching rate of manganese reached 88.74%.

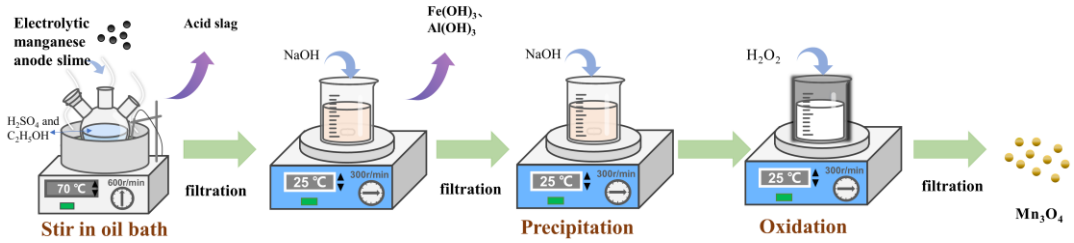
In addition, Mn_3O_4 catalyst was synthesized and used to activate hydrogen persulfate (PMS) to degrade tetracycline hydrochloride (TCH). The synthesized Mn_3O_4 was characterized by XRD, XPS, Raman, SEM and HRTEM. The catalytic activity of Mn_3O_4 for PMS to degrade TCH was increased to 82.11%.

The activity of Mn_3O_4 is attributed to containing Mn(II) and Mn(III) at the same time, which can quickly realize the transformation of high-valence and low-valence manganese, promote the

transfer of electrons, and realize the degradation of organic pollutants.

Q3: Scheme 1 should mention the solids separated in each step. For instance the Fe/Al.

R3: We appreciate the reviewer's comments. The scheme 1 has been modified in the revised manuscript.



Scheme 1 Synthesis procedure of highly active Mn3O4 from the electrolytic manganese anode slime.