Response to Reviewer 1 Comments

Point 1: There is no clear indication of the scale bars.

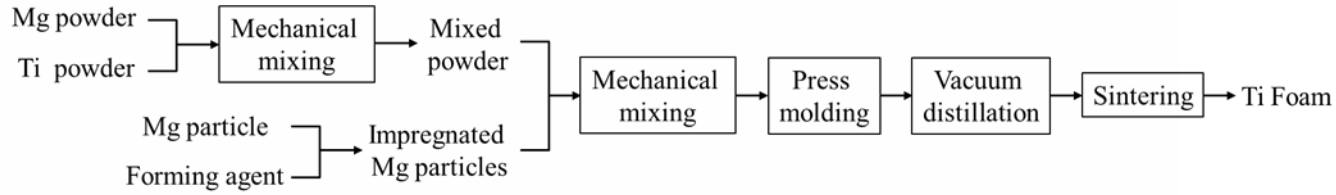
Response 1:

In order to increase the image clarity, a scale is artificially added in the SEM image according to the original size, involving the original Fig.1, 2, 5, 7, and 9.

Point 2: Adding more explanations or a schematic of the space holder method would be helpful.

Response 2:

In order to more clearly describe the preparation process of titanium foam by space holder method, the process flow chart is added, shown in Fig.2



Point 3: Fig.4 should be labeled a, b, and c and described in the caption.

Response 3:

In order to distinguish the shielding effect of magnesium particles, the three diagrams in original Fig.4 are named “a, b and c” respectively and explained in the figure title.

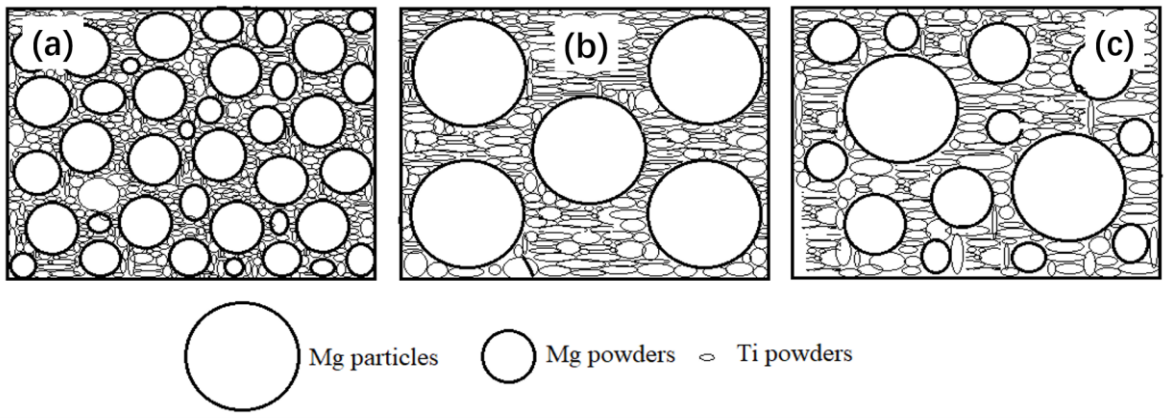
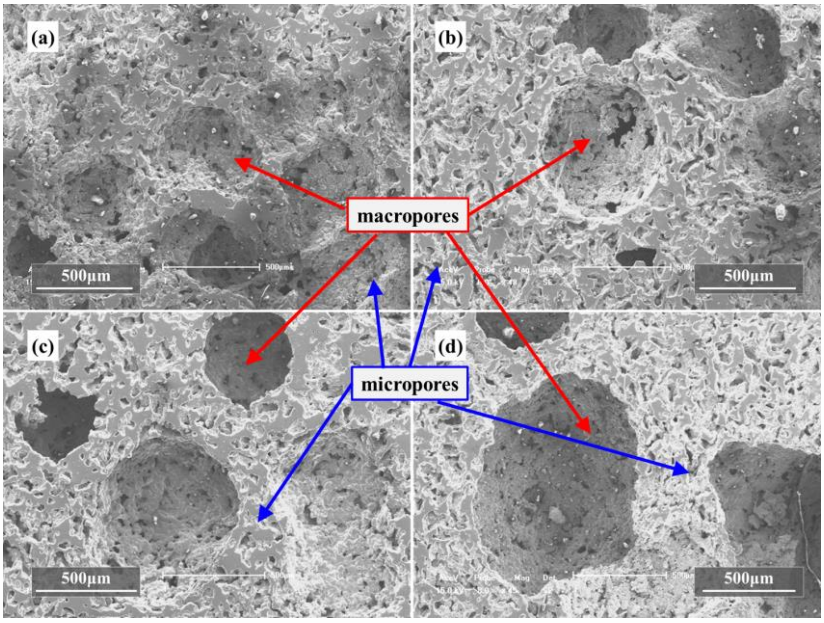


Figure 4 Schematic diagram of the mixed Ti powders, Mg powders and Mg particles in the green compact, (a)mixture of Ti powders and Mg powders, (b) mixture of Ti powders and Mg particles, (c) mixture of Ti powders, Mg powders and Mg particles

Point 4: Please specify the micro and macro pores in Fig.7.

Response 4:

In the four images in original Figure 7, marks of macropores and micropores have been re-added to distinguish between macropores and micropores.



Point 5: Are the stresses and strains true or engineering? Please modify the title of stress-strain curves.

Response 5:

Because the influence of cross-sectional area of the sample on stress during compression is not considered, the obtained stress-strain curves are all engineering stress-strain curves, and the original Fig.14, 16 and 18 have been modified.

Point 6: For the 50vol%, no plateau is observed (Fig. 14). Why?

Response 6:

It can be seen from the curves that the maximum stress of titanium foam increases significantly with the decrease of magnesium powder addition, and the strain range covered

by the maximum stress peak is wider, meanwhile, the stress fluctuation in this range is more obvious. Therefore, it is not that there is no existence of stress plateau zone when 50% volume fraction of magnesium powder is added, but, the stress plateau zone does not appear when the strain reaches 20% only.

The contents in the original text are not very clear, and the original manuscript has been revised at the same time.

Point 7: Why does the maximum stress decrease with the increasing size of magnesium particles (Fig.16)? Please explain in the text.

Response 7:

As shown in Fig.16, the maximum stress of the curve is about 14MPa when the granularity of magnesium particles is between 270~380 μm, 380~550 μm and 550~830 μm. However, when the particle size of magnesium reaches 830~1700 μm, the maximum stress decreases significantly. It shows that the larger change in particle size will also have a greater impact on the maximum stress.

The original text description of this part is not very accurate, and it will be revised at the same time.

Point 8: Why is the variation in the elastic modulus with volume fraction fluctuating (Fig.19)?

Response 8:

Although the ratio between magnesium powder and magnesium particles has certain influence on the elastic modulus, it does not show obvious regularity. The reason may be that the strain region of elastic deformation is very small, and the effect of the change in the ratio between magnesium powder and magnesium particles on elastic modulus is accidental to a certain degree.

Point 9: I think that it would be beneficial to compare these results with those obtained with Mg spacers fabricated from Ti foams.

Response 9:

As this reviewer's comment is not very clear, we regret that we can not make further revision.

Finally, we would like to express our sincere thanks to the reviewers for their valuable comments, which will greatly improved the writing quality of this manuscript.