The paper
Size effect of Mg powders on structure and mechanical properties of Ti foam synthesized by space holder technique, by H. Luo et al., presents an interesting study of Ti foam made by sintering and based on a Ti-Mg powder mixing. The Authors present very detailed results of the study of the effects due to powder ratio and particle size of the Mg component used as space holder. The Authors present the results of the mechanical measurement of stress-strain done in the collection of different specimens analysed, what is a novel set of results related to Ti foams. The paper is well structured and presented, and correctly written, with a collection of quality results to support the discussions.

The interest in publishing these results is rather clear. However, before considering publishing, some points must be revised. I am confident that the Authors can check the comments and provide the (namely) missing information required to improve the draft.

- - - - REVIEW COMMENTS - - - -

L11... Titanium foam has been pained more attention...

pained? Check meaning and correct.

L18 ...temperature to removal of magnesium and obtain the Ti foam ...

Check meaning and syntax: 'to remove the Mg...?'

L29
... structural applications in the aerospace, naval [1, 2] and biomaterial industries [3], ...

[2] is an interesting review. However, the reference to [1] and [3] is quite loose as it is now. Most probably, the authors point to the references mentioned in [1] and [3]. That is a reference of a reference, not the original source.
Consider to re-write as:
... structural applications in the aerospace, naval and biomaterial industries as reviewed in [1-3] and references therein.

[2] is from 2001. Please check if more updated literature is available. For instance https://doi.org/10.1179/175355510X12744412709403

L33
reference [4] makes no mention about anything related to high temperature applications such as catalyst substrate or heat exchangers

Check and update.

L42
In the available space holders for ... more and more attempts have been made...

Check the syntax. Otherwise, consider to re-write as:
Different options have been used as space holders and more attempts have been made...

L45
... sintering of Mg and Ti-powder compacts 7,13

Note that refs-3 and 18 are also about Mg-based foams.
Check the references and make the right pointing to the references of those works using Mg - Ti mixing for sintering.

L46
...regarded as an environmentally friendly method [14].

[14] makes no mention about anything related to any kind of environmental analysis.
Check and update.

L49
... magnesium is not soluble in any appreciable amount in Ti, ...

Provide a reference about this statement.

L54
... in the biomedical applications, magnesium can be removed by the body ...

This self-absorption effect is generally known, however a proper reference must be provided.

L56
...It is accepted that appropriate type, shape, size and amount of the spacer holders lead to a desirable pore structure...

Support this statement with some of the previous references (maybe [3]? other?)

L81
...To achieve this goal, two sizes of Mg spacers were chosen for fabrication of Ti foams, one is small particle, called as powder, the other is big particle with size in a wide range...

The description is confusing: two sizes ?
Probably the Authors are 'connecting' with micro- and macro- pore sizes. However, the Mg material is not of 'two sizes'. Consider making a description much more clear, kind of:
To achieve this goal, Mg was used as spacer for the fabrication of Ti foams. Some foams were made using small sized Mg particles, referred here as 'powder' and comparable to the Ti particle size. Other foams were made using Mg particles with a much bigger size range, referred here as ' Mg particles'.

L64
...Generally, there are two types of pores, namely macropores and micropores in the Ti foams manufactured by evaporation of magnesium particles from Ti / magnesium green compacts.

Do the Authors refer to other previous works ? Then, provide the references (maybe [3] [18]...?) .
Or maybe, the Authors refer to the results of this paper ?

L74
...However, to the best knowledge of the authors, few reports are available about size effect of Mg particles on pore structure, porosity and it is open part, as well as mechanical properties for titanium foams.

- -
'porosity and it is open part'
Some syntax error? What is the meaning ?

- -
...as well as mechanical properties for titanium foams.
Be more specific and complete the sentence:
...as well as some relevant mechanical properties for titanium foams, namely compression stress-strain profiles and elastic moduli.

L78
...it is the purpose of this work to study the size effect of Mg spacer on structure with attention on open porosity and pore size, and mechanical properties of Ti foams using powder metallurgical space holder technique.

These lines are very confusing and misleading. Consider to check and re-write.
Consider this revision:
...it is the purpose of this work to study the size effect of the Mg spacer on the foam structure with attention on open porosity and pore size, as well as also then effect on the mechanical properties of Ti foams using the powder metallurgical space-holder technique.

L82-ff
This paper, firstly, describes the structure of Ti foam samples, by powder metallurgical space holder technique, in which both magnesium powders with an average size about 48μm and magnesium particles in a range of 270-1700μm were employed, respectively. In addition, the particles were further divided into ranges of <270μm, 270~380μm, 380~550μm, 86 550~830μm and 830~1700μm. And, mixed Mg spacers by both powders and particles at 87 different size range with different percentages were also considered for fabrication of Ti foams.

These lines are very confusing and misleading. Consider to check and re-write.
Consider this revision:

This paper, firstly, describes the structure of Ti foam samples, made by using the powder metallurgical space-holder technique, in which both magnesium powder (particle average size about 48μm) and magnesium particles (in a size range of 270-1700μm) were employed. The Mg particles were additionally sieved and the samples further divided into five groups according to the ranges of particle sizes: <270μm, 270~380μm, 380~550μm, 550~830μm and 830~1700μm.
(remove the last sentence: it is very confusing)

L86
... were further divided into ranges ...

Be more specific:
... were further sieved and divided into ranges ...

L89
...Then, the structure of the obtained samples was characterized with attention on the open porosity, pore size, and the properties were evaluated, including compressive properties and elasticity modulus...

Be more specific and make simpler and clearer statements:
...Then, the micro-structure of the obtained samples was characterized with special attention on the open porosity and pore size. The (compression) stress-strain curves were measured and the maximum stress and elastic moduli were defined.

L91
At last, the compressive properties...

Consider to re-write:
Finally, the compressive properties...

L92
this sentence just repeats the previous mentioned information ?
Consider to remove.

- - - - - - Section-2

- - - Provide the origin details of the Ti and Mg chemical products: commercial? lab produced?

- - - Comment on the number of specimens used for each foam type, also if it one single specimen. This has an effect on the dispersion of the results presented and it is important for appreciating the value and quality of the data presented.

L99
...Ti powders (98.9% purity) with an average size of 26μm and magnesium powders (99.5% purity) ...

Comment briefly on the impurity content. What other materials are present? Can they somehow influence the results ?

L101-ff and Figure-1
- - - It is important that the text refers to specific plots to help understanding and avoid confusion: Ti powder is (a) etc. So state it in the text while describing the shapes and sizes.

Some comments and the plots are misleading. Consider the next:

- - - ...Mg powders are generally near spherical with diameters of <80 μm,...

This is supposed to correspond to plot (b). It is hard to agree with the spherical shape and thus with the diameter reference.

- - - ... Furthermore, magnesium particles (99.8% purity) with a wide range of distribution (270-1700μm) and an average particle size of 660μm was also used as spacers...

Looking at plot (c), it is possible to see only one size-type. It seems the average type (?). Therefore, comment what is the picture about, and if the rest of size-ranges are similarly shaped.

- - - ...The Mg particles possess the same shape as that of the Mg powders...

By comparing plots (b) and (c) this comment is hardly possible to consider !

Figure-1
The data on the pictures about scales are hardly visible. Consider to add the relevant information in the caption, if necessary.

L121
...At last, after mixing the Ti powders with the Mg particles at the optimal size range due to the results from the second group samples, the Mg powders were added into the mixture, the total amount of Mg particles and Mg powders was fixed at 70 vol. %...

The sentence is very confusing. Re-write this sentence with a clearer meaning, Consider this revision:
...Finally, considering the best results from the second group of samples, new samples were prepared by adding Mg powder to reach a total amount of 70 vol% of Mg in the mixing.

L124
...the mixing procedures mentioned above were carried out as following...

The Authors refer to a mixing solution 'necessary for the uniform coating of Mg powders/particles'

About this coating effect, can the Authors explain better? It is about a better mixing of Ti and Mg: but what is 'coating' ? Is it about 'coating with Ti powder' ? Explain clearly.

L124-ff
This is a one-sentence paragraph of 10 lines to explain the method. Please, make it simpler and clearer. The procedure is unclear as described now.

Are the powders dry before mixing? The solutions are made before or after mixing? what is the solution ratio ? is the ratio important?

L139
..At last,...

Consider to use 'Finally'

L146
... using a Jeol 146 JSM 6400 microscope equipped with the Noran System 6 X-ray microanalysis system.

--- Mention the firm data
JEOL Ltd Akishima, Tokyo, Japan.

--- Mention the firm data
Thermo Fisher Scientific, Waltham, MA USA 02451

L150 ... commercial software (KS400, for Zeiss Axiophoto 2 image...

Mention the firm data
Carl Zeiss Microscopy Deutschland GmbH, 73446 Oberkochen, Germany

L159 ...INSTRON 55822 ...

Mention the firm data
INSTRON Cop. Norwood, MA, 02062-2643 US

- - - - Section 2.3

Since the Authors provide measured data, it is important to mention the uncertainty for both, stress and strain. It is enough a general value, as 1%, 5%... in the measured range. This will make valuable the results presented later.

L151 ... the line shrinkage ...

Consider to correct to 'linear shrinkage'

- - - - - - Section-3

L172
... As the plasticity of titanium powder is lower

This comment seems to be result of the discussion done in the next lines.
Therefore, consider to mention that, otherwise it is confusing.

Figure-2
The data on the pictures about scales are hardly visible. Consider to add the relevant information in the caption, if necessary.

L198 & Figure -4
...shielding effect can be described as the schematic diagram shown in Fig. 4...

Describe Fig 4 in te text.
Make a clear connection of the plots with the text discussion.
Use also the caption properly, referring to the different panels.

L216
The microstructure of the sintered mass at the cross-section normal to the compacted surface by Ti powders and Mg powders are shown in Fig.5.

Describe Fig 5 in the text.
Make a clear connection of the plots a-b-c-d with the text discussion: 'the number of the micro-pores increaseS, compare the sequence of plots ...'

(correct also 'increaseS')

Figure-5
The data on the pictures about scales are hardly visible. Consider to add the relevant information in the caption, if necessary.

L229
...were also evaluated along both horizontal direction and vertical direction...

The Authors mentioned the linear shrinkage referred to the height of the compact. Now they refer to horizontal and vertical directions. Even if it may be trivial, the description should be complete to avoid any misunderstanding on the data presented. Relate vertical and horizontal to specific parameters on the cylindrical compact.

L232
...The line shrinkage increases...

Consider 'linear shrinkage'

L252. ... s shown in Fig.7.

Describe Fig 7 in the text.
Make a clear connection of the plots a-b-c-d with the text discussion.

L295 ...as shown in Fig. 9...

Describe Fig 9 in the text.
Make a clear connection of the plots a-b-c-d-e with the text discussion.

Section 3.3 - - - - -

- - - Consider to split into two subsections, with and without Mg-particles. This will help presenting the results.

- - - Set clear that the strain refer to compresion !

L381-385
...Titanium foams having porosities of about ... and the percentage of Mg powders in the mixed Mg spacers.

These initial lines seem to make a summary of the results discussed in the next pages. This is bizarre: to summarize the the still unknown results. Consider to introduce the section about what will be presented. Present the results. And finally, make the summary.

L389
... a linear elastic region, and a plateau stage ...

The platau is not vsible for the 50% volume fraction specimens. Mention that difference.

L391
...stress-strain curves are flat without any significant fluctuation...

It seems that 'flat' refers to the comparison in respect to the results in figure-16. It is necessary to make such reference, so the Readers can understand the comment. Otherwise change the description as:
...stress-strain curves are SMOOTH without any significant fluctuation...

L394
... the plateau is associated with the buckling and collapse of the cell walls; and the subsequent increase in stress is ...

The comment makes sense about the plateau. But there is no increase in the curves. Explain clearly the comment made about that.

L396-ff. VS L430-ff
The Authors present a discussion about strain localization and stress concentration, and finally they propose that are not present in the measured results. Then, in the next round of results (L430-ff) they propose that the fluctuations be attributed to the local stress concentration during the compression.

This discussion is hard to follow as it is presented now, with a no-effect case first, and the effect-case later. Consider to explain concentration effects at the time the results for macro-pore foams are presented (fig 16). And at that point, compare with the missing effects in the previously presented results (figure 14).
Would it make it easier to follow the discussion?

L425
At this point, the results corresponding to the specimens with Mg-particles begin. Consider to make a new sub-section at this point.

L425
...In the case of the green compacts by not only Ti powders and Mg powders but also Mg particles with volume ratio 1:1:1 after sintering...

It is barely understood. The sentence must be clearer. Consider to re-write as:
...In the case of the green compacts made including both Ti and Mg powder and Mg particles with volume ratio 1:1:1 after sintering...

L428
...It can be found that the stress-strain curves are different from those manufactured with Mg powders only, apparent fluctuation...

It is barely understood. The sentence must be clearer. Consider to re-write as:
...It can be found that the stress-strain curves are different from those curves measured on specimens manufactured with Mg powder only, apparent fluctuation...

L467
...Ti foams containing micropores in addition to macropores as a result by removal of Mg spacers composed of both smaller...

Check the syntax about 'by removal': is it 'of removing the Mg spacers' ?

L469
...It is found that the magnesium powders play (A) more important role

Add the missing A article.