Dear prof Rada Petrović,

Thank you very much for your time and effort dedicated to my manuscript "Establishing the features' influence of the annealing process mode on stress elimination in the foam glass structure" and express my gratitude for helpful comments.

I have revised my manuscript according to the reviewer’s recommendations. I hope that the executed modifications will make the manuscript qualified to be published in the journal.

**Responses to the comments of the Reviewer.**

1. The title should be clear and concise. Please, think about changing the title.

The title of the manuscript is shortened and concretized. New manuscript title is «The influence of the annealing mode on stress elimination in the foam glass structure»

2. Long and unclear sentence, so please consider rephrase.

The calculation results are demonstrates changes in the stress of the sample during cooling at various speeds (100, 10 and 1°C/min), the temperature difference of the subsurface layer of the sample depending on different temperatures from the onset of cooling, the viscosity values of the subsurface and central layers depending on different temperatures from the onset of cooling, stresses in the foam glass during cooling, as well as changes in stresses, temperature and viscosity of the subsurface and central layers.

The sentence is rephrased.

"The calculation results are presented in graphic form. The graphics show the changes in stress in the foam glass upon cooling at speeds of 100, 10 and 1 °Cmin-1. The temperature difference and the viscosity values of the foam glass subsurface and central layers as a dependency of the different temperatures of the cooling onset are presented."

3. “One of the main technological operations that determines the *above* properties of foam glass is annealing.” (above - ?).

The sentence is rephrased:

"One of the main technological operations that determines the mechanical strength of foam glass is annealing."

4. Long and unclear sentence, so consider rephrase.

At this stage, when the temperature of the environment surrounding the foam glass changes, a gradual transfer of heat from one layer of the sample to another occurs due to the limited thermal conductivity of the material, which, in turn, leads to a temperature difference between the outer and inner layers and is the cause of stresses that affect its quality.

The sentence is rephrased:

"At this stage, because of the limited thermal conductivity of the material, changes in the temperature of the environment the foam glass leads to a gradual transfer of heat from one layer of the sample to another occurs. This, in turn, leads to a temperature difference between the outer and inner layers and is the cause of inner stresses. Those stresses affect the foam glass quality."

5. Inappropriate

In this research [15], it was found that the most effective method for studying the production processes of foam glass is the use of mathematical modeling. In particular, including the study of the process of annealing foam glass.

In article [15], it was concluded that "The mathematical models enable us to solve problems taking into account the complex relationships between the process parameters, which depend on the temperature and changing geometry, and to calculate the heat losses. The models take into account changes in the geometrical dimensions of the material.".

So I think that rephrased as

"Previously [15] the successful use of mathematical modeling to describe physical and chemical processes at all stages of foam glass production with sufficient accuracy, including at the annealing stage, was established."

is more appropriate.

6. Temperature?

“rate”

The expression "cooling rate and initial annealing rate" refers to the initial annealing rate.

7. °Cmin-1. Same throughout the text.

The error is fixed throughout the text per the remark.

8. The designation of physical quantities by small greek letters must be in italic.

The error is fixed throughout the text per the remark. Physical quantities in small Greek letters are all in italic.

9. Mass fraction?

*g*i in this part of the text are the weight coefficients.

Weighting coefficients *g*i characterize the contribution to the property P of the displacement of each of the equilibria in the internal temperature Tfi for each of the equilibrium states at the current time [Mazurin O.V, Startsev Yu.K. Khodakovskaya R.Ya. Relaxation theory of glass annealing and calculation based on it of annealing modes. Tutorial. - M.ZHMHTI them. D.I. Mendeleev, 1987. -83 p. P. 36]

10. Indexes having the meaning of physical quantities must be in italic.

The error is fixed throughout the text per the remark. Indexes having the meaning of physical quantities are all in italic.

11. The units must be given according Instruction for authors.

m2/g

All measurement units here and hereinafter was corrected per the Instructions for authors:

m2g-1

12. The given data do not represent the mass composition of the mixture.

mass%

Data on the mass composition of the mixture are processed as follows:

The batch mixture composition, in mass%: ash and slag waste, 30; crushed glass, 70; borax, 5; anthracite, 5; this composition is 5 over 100% of the basic components.

13. Anthracite?

Anthracite content 5 mass% over 100% of the basic components.

14. Preset?

The sentence is rephrased:

"The sample was foamed and annealed in a muffle furnace with electrical heaters at a preset temperature-time mode [26]. A preset temperature-time mode is as follows. Prepared samples are loaded into a cold oven. After that, a temperature of complete combustion of contained volatile substances (500 °С) with 16 °Сmin-1 rate will be reached. The next stage is keeping the sample in the oven for 20 minutes, which will lead to an even warming-up of the sample, and will have a positive effect on the further process of foaming. After the temperature of foaming (825 °С) is reached, the time of keeping the material in the oven is 20 minutes. Afterward, there follows an abrupt decline of the temperature to 600 °С to fixate the structure of the material. In the end stage, the samples are cooled with 2,8 °Сmin-1 pace down to 25 °С.".

15. Additional explanations should be mentioned in the figure caption.

The error is fixed in the text per the remark: additional explanations are mentioned in the figure caption.

16. Please, explain this.

Then, the fixed structure was annealed for 200 minutes (12,000 s) at a temperature of 600 °C with a preliminary exposure of 30 minutes.

Clarification on this issue is contained in paragraph 14 of the comments. This part of the text is deleted from the article.

17. Please, provide the table in the correct form.

The error is fixed in the text per the remark: the table is presented in the correct form.

18. "wt. %" should be replaced by "Mass%".

The error is fixed in the text per the remark.

19. Please state this more clearly.

The emission of gases in the inner part of the sample terminated gradually with the decrease in temperature, and the gas exited the furnace in a relatively even pressure state.

The intensity of gas emission inside the pores of the foam glass decreased in proportion to a decrease in the temperature of the inorganic frame of the foam glass. At the end of the foam glass manufacturing process (at the end of the last production stage), the gas pressure inside the pores was approximately equal to atmospheric pressure.

20. "1/3 atm. (33.8 kPa) in the cells" should be replaced by "33.8 kPa in the cells".

The error is fixed in the text per the remark: designation 1/3 atm. was deleted.

21. Journals often require both the manufacturer's name and location for specialized equipment, software, and reagents. Please consider adding this information based on the journal’s guidelines.

Both the manufacturer's name and the location was added as follows:

"Measuring system TC-9000H (ULVAC, Japan) at the Common Use Center “Technologies and Materials of National Research University BelSU,” Belgorod, Russia.".

22. The title is not appropriate.

The error is fixed in the text per the remark. The appropriate title is:

"The thermal conductivity and specific heat of foam glass determining results".

23. The designations of physical quantities must be in italic throughout the text

T/ °C

α/ cm2s-1, same throughout the text.

The error is fixed throughout the text per the remark:

*Т* / ° С

*α* / cm2s-1

24. Values and units are in upright letters. *146*

units, instruction for authors kg/m3

The error is fixed throughout the text per the remark:

146 kgm-3

25. Units according to Instruction for authors kg/m3

The error is fixed throughout the text per the remark:

kgm-3

26. Please, explain - NEQ

"NEQ" is the Russian addition abbreviation for some international standards. In this case, it is don't necessary. The text is deleted.

27. Unnecessarily N/m2

I agree, the text is deleted.

28. "stress" instead "voltage".

I agree the text is replaced.

29. "*σ* = 2.6 MPa,

*ε* = 0.002070 and *E* = 1256 MPa"

instead "therefore, *σ*=2.6 MPa, *ε*=0.002070, and *E*=1256 MPa".

I agree the text is replaced.

30. "1.07·е-8 " – е - ?

In this case, implied "1.07·10-8"

The text is replaced.

31. italik "µ".

The error is fixed throughout the text per the remark: physical quantities in small Greek letters are all in italic.

32. "The maximum time step value was determined to be 10 s according to [33]." - ?

The value of the maximum step was determined equal to 10 s according to the formula in [33] on page 53 in order to eliminate the instability of the numerical solution.

33. "stress" instead "voltage".

I agree the text is replaced.

34. " Figure 2 shows the stress changes in the sample during cooling at different speeds: " – From which temperature the cooling started?

The sentence is rephrased to provide information on the initial cooling temperature:

"Figure 2 shows the stress changes in the sample during cooling starting with 600 °C at different speeds:".

35. "100 °Cmin-1" instead "100°C/min".

I agree the text is replaced.

36. The designation of physical quantities must be in italic

The error is fixed throughout the text per the remark: physical quantities are all in italic.

37. The axis name size is too large, the size of the data marker should fit the data. It is desirable to add a determination error.

Figures 2-8 are fixed per the remarks.

Because Figure 2 shows the calculated data, the determination error on the graph is not indicated.

38. Additional explanations should be mentioned in the figure caption.

Figures 2, 4, 5 are fixed per the remark: additional explanations are mentioned in the figure caption.

39. Please, check this.

"the range of the logarithm of the viscosity of the foam glass is 10 ... 16 Pa·s".

The sentence is rephrased:

"the range of the decimal logarithm of the viscosity of the foam glass is 10 ... 16 Pa·s ".

40. Inadequate division of y axis and size of numbers

Figures 2-8 are fixed per the remarks.

41. "Figure 4 shows the viscosity values of the subsurface and central layers depending on different temperatures of cooling onset, and Figure 3 shows the temperature difference between the subsurface and central layers of a sample depending on various temperatures of cooling onset. The cooling rate is set as a constant, and its value was 1.5°C/min"

– the explanation of Figure 3 should be given before the explanation of Figure 4. In the case of Figure 3, it should be emphasized that the cooling rate was 1.5 °Cmin-1 regardless of the initial annealing temperature

The text is rephrased:

"Figure 3 shows the temperature difference between the subsurface and central layers of a sample depending on various temperatures of cooling onset. The cooling rate is set as a constant, and its value was 1.5 °Cmin-1 regardless of the initial annealing temperature. Figure 4 shows the viscosity values of the subsurface and central layers depending on different temperatures of cooling onset.".

42. "1.5°C/min" – How is this related to the previous one given in Figure 2?

The cooling rate is set as a constant, and its value was 1.5 °Cmin-1 regardless of the initial annealing temperature. This is relevant to Figures 3, 4 only. The text in the article is replaced.

43. "Fig. 4. The viscosity of the layers depending on different temperatures at the beginning of cooling." - Additional explanations should be mentioned in the figure caption.

Figure 4 is fixed per the remarks.

44. "Fig. 5. Stresses in foam glass during cooling of foam glass with different initial annealing temperatures." - The explanation of Fig a and b should be given in Figure Caption

Figure 5 is fixed per the remarks.

45. "The dependence of stress, viscosity and temperature of the subsurface and central layers on time are shown in Fig. 6-8."

instead

"Consideration of a three-stage annealing mode. Changes in stress, temperature and viscosity of the subsurface and central layers are presented in figures 6-8.".

The text is rephrased according to the proposed option.

46. "Moreover, the total value of the effect in this case is more significant than in the case of a decrease in the cooling rate, as a consequence of 3-4 orders of magnitude higher viscosity at 460°C than viscosity at 600°C, so stress relaxation is practically absent"

instead

"Moreover, the total value of the effect in this case is more significant than in the case of a decrease in the cooling rate. This is due to the fact that the viscosity at a temperature of 460°C is 3-4 orders of magnitude higher than the corresponding values at a temperature of 600°C and stress relaxation is practically absent.".

The text is rephrased according to the proposed option.

47. "A. D." – Do the same throughout the references.

The designations of the authors' initials in REFERENCES are fixed per the remark.