Templates for Different Documents in Article Writing

Manuscript

Fatigue properties of nano-composites

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Abstract:

Keywords: Fatigue; Nano-composite

Introduction

Nano-composites have been widely used in aerospace industries.

Verma et al. [1] estimated the fatigue lifetime of epoxy-alumina nanocomposites. They prepared nano-composite samples included 0.5, 1 and 1.5 wt % of alumina nano-particles. They found a proper dispersion of nano-particles in the epoxy matrix. Their results of tensile fatigue testing at R=0.1, showed an increase in the fatigue lifetime of nanocomposites, with 1.5% alumina particles.

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Based on the literature review, it could be concluded that

- Most articles are about mechanical properties of nano-composites.
- …

Therefore, the novelty of this research could be investigating a special nano-particle on fatigue properties of aluminum alloy.

In this research, …

Materials and Experiments

1) Sample preparation

2) Finite element modeling

3) Testing

Studied material in this article is an aluminum alloy, which has been widely used in automotive engineering.

Results and Discussion

1) Microstructure investigations

2) Fatigue properties

3) Fracture analysis

Conclusions

In this research, fatigue properties of nano-composites were characterized by experiments. Obtained results could be listed as follows,

Acknowledgement

Authors would like to thank Irankhodro Powertrain Company.

References

[1] V. Verma, D.K. Shukla, V. Kumar, Estimation of fatigue life of epoxy-alumina polymer nano-composites, Procedia Materials Science, 5 (2014) 669-678

[2]

Biography

Mohammad Azadi was born in Shiraz, Iran in 1983. He received B.Sc. and M.Sc. degrees in mechanical engineering from Shiraz University, Shiraz, Iran and K.N. Toosi University of Technology, Tehran, Iran, respectively, in 2006 and 2008; and then, the Ph.D. degree in mechanical engineering from Sharif University of Technology, Tehran, Iran, in 2013. During his Ph.D., he has awarded an exchange program by the Ministry of Science, Research and Technology and also Irankhodro Powertrain Company, in order to perform a fatigue testing project in University of Leoben, Leoben, Austria, 2012.

From 2008 to 2015, he has worked in Irankhodro Powertrain Company, Tehran, Iran and for last two years, he was a project manager of a national turbo-charged engine. Since 2015, he has been an Assistant Professor in the Faculty of Mechanical Engineering, Semnan University, Semnan, Iran. He is the author of two chapter-books, two conference proceedings, more than 70 journal articles, about 100 conference papers and 7 patents. He has been also funded to perform 8 research projects by Iranian universities and industries; and also, one international project, entitled "Iran-Austria Impulse". He is an advisory board of International Journal of Engineering and also a reviewer in different ISI journals. His research interests include solid mechanics, fatigue, fracture and creep, numerical methods, surface engineering, materials characterization, design of experiments, with the application of engine, aerospace and automotive industries, besides biomechanics.

Conflict of Interest

Dear Editor-in-Chief,

For our article, entitled "***The temperature effect on creep and fracture behaviors of aluminum matrix nano-SiO_2-composite, comparing to AlSi12Cu3Ni2MgFe aluminum alloy***", which has been submitted to your journal for reviewing, there is no conflict of interest.

Regards,

M. Azadi, PhD.
Faculty of Mechanical Engineering, Semnan University, Semnan, Iran

Cover Letter with Novelty

Dear Editor-in-Chief,

Our article, entitled "***The temperature effect on creep and fracture behaviors of aluminum matrix nano-SiO_2-composite, comparing to AlSi12Cu3Ni2MgFe aluminum alloy***", has been submitted to your journal for reviewing. First of all, thank you for such job on our article. Then, all authors have agreed to submit this manuscript.
It should be noted that our article is an original work, which has not been submitted or will not submit elsewhere; neither journals nor conferences, besides an agreement of all authors.

The novelty of this article could be mentioned as follows,

- Based on the literature review in the article, researches about creep properties of aluminum matrix nano-composites are still rare. However, articles about other material properties of nano-composites have been published more and more. Therefore, as the novelty of this article, the high-temperature creep behavior in the aluminum matrix SiO_2 nano-composite has been characterized. Besides, studies about the used piston aluminum alloy (AlSi12Cu3Ni2MgFe) plus the selected nano-particle (SiO_2) are rare, comparing to other aluminum alloys and other nano-particles. Authors could not find the exact material in published articles, where investigated creep properties. Another interesting result was a significant increase in the creep lifetime of the introduced nano-composite.

Regards,

M. Azadi, PhD.
Faculty of Mechanical Engineering, Semnan University, Semnan, Iran

Cover Letter

Dear Editor-in-Chief,

Our article, entitled "***The temperature effect on creep and fracture behaviors of aluminum matrix nano-SiO_2-composite, comparing to AlSi12Cu3Ni2MgFe aluminum alloy***", has been submitted to your journal for reviewing. First of all, thank you for such job on our article. Then, it should be noted that our article is an original work, which has not been submitted or will not submit elsewhere; neither journals nor conferences, besides an agreement of all authors.

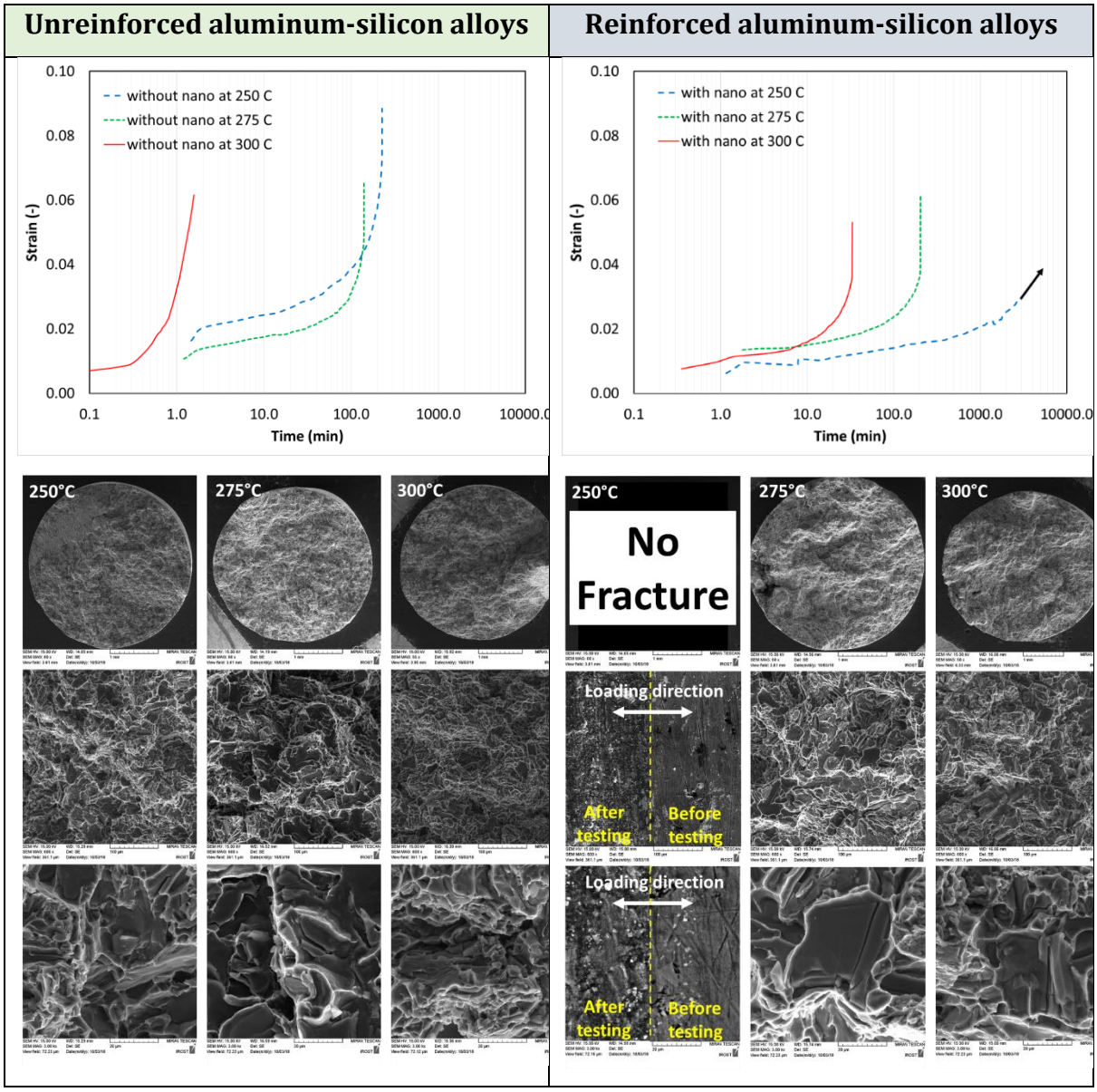
It should be noted that all authors have made substantial contributions to (a) the conception and the design of this study, the acquisition of experimental data, the analysis and the interpretation of data; (b) drafting the article and will cooperate in revising the article critically for important intellectual contents; (c) the final approval of the article version, which is submitted.

Regards,

M. Azadi, PhD.

Faculty of Mechanical Engineering, Semnan University, Semnan, Iran

Graphical Abstract



Highlights

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- Temperature was significantly affected creep properties of as-cast and reinforced aluminum alloys.
- An effectively improvement was obtained by adding SiO_2 nano-particles and heat treatment.
- Fracture surfaces of both materials indicated same brittle behaviors.
- Creep lifetimes of nano-composites increased, comparing to that of aluminum alloys.
- Failure locations changed from inside intermetallic phases into boundaries in nano-composites.

Answers to Comments

Dear Editor-in-Chief,

First of all, we should thank you and your respected reviewers for reviewing our article, entitled "***Temperature effect on creep and fracture behaviors of nano-SiO2-composite and AlSi12Cu3Ni2MgFe aluminum alloy***". Then, we have tried our best to address all comments in the revised article. All changes were highlighted in yellow-colored sentences. Besides, answers to all comments could be seen in following paragraphs.

Regards,

M. Azadi, PhD.
Faculty of Mechanical Engineering, Semnan University, Semnan, Iran

Reviewer 1:

In this research, the temperature effect on creep and fracture behaviors of aluminum matrix nano-SiO2-composite, comparing to AlSi12Cu3Ni2MgFe aluminum alloy investigated. The method used in this study is interesting and has valuable results. Introduction of the article is very interesting and carefully prepared. The present work is also valuable and well presented.

Answer: We thank the respected reviewer for his/her beneficial comments. We have addressed all comments in the revised article.

- In Fig. 3a, for the time-dependent creep strain graph, logically differentiate the curve at 300°C from the other two temperatures.

Answer: The respected reviewer is correct. The reason for such a behavior was the creep lifetime at 300°C, which was too short (1.6 min and 33.4 min for specimens, without and with nano-particles). To address this comment, the following paragraph was added to the revised article.

> *As another note, for data at 300°C, curves of the strain and also the strain rate were logically differentiated from curves for two other temperatures. The reason for such a behavior was the creep lifetime at 300°C, which was too short (1.6 min and 33.4 min for specimens, without and with nano-particles), comparing to other creep lifetimes at two other temperatures.*