

Response to Reviewer 2 Comments

Point 1:

Dear Authors,

Thanks for this nice piece of work. It merits publication in Metals, but with some more analyses I believe.

You indicate that Cu is partially present. This could create Guinier-Preston zones with the presence of Mg. As you know, such precipitated zones influence largely mechanical properties of aluminum. Prior works by Wintenberger should be read on this. But since your XRD diagrams are not fitted, one cannot estimate if the phase-check by Panalytical softwares are valid. You should use Rietveld analysis to estimate which phases are indeed present, and to quantify their amounts.

Unfortunately, you only give EDS spectra for most of the samples, which cannot ascertain the various phases. You could have also measured XRD diagrams or Raman spectra to identify and quantify all the phases in the composites.

So that I feel that before your work being publishable, a little more work is needed.

sincerely

Daniel Chateigner

Response 1: In the current work, copper was mainly added by adding Cu-14 wt.% P master alloy. The presence of Cu could create Guinier-Preston zones with the presence of Mg. Unfortunately, because this batch of test samples is incomplete, XRD diagrams or Raman spectra can not be measured to identify and quantify all the phases in the composites. However, the effects of the presence of copper were analyzed. The composition analysis we have done before showed that the copper content is around 4 wt.%. XRD results showed that CuAl_2 was present, indicating that a part of Cu reacted with Al. Even if the remaining part of Cu formed Guinier-Preston zones with Mg, the number is relatively small. The small number of Guinier-Preston zones also had a very limited impact on wear resistance. In addition, Guinier-Preston zones influence mechanical properties of aluminum, but mainly the hardness and the strength. In the current work, the wear resistances of $\text{Mg}_2\text{Si}/\text{Al}$ composites with similar Cu content were studied. According to previous studies [18] [<http://www.ams.org.cn/CN/10.3724/SP.J.1037.2013.00726>] and [22] [<https://doi.org/10.1016/j.wear.2007.05.008>], no precipitation zone was found to have a significant effect on wear resistance. Therefore, we think Guinier-Preston zones have little influence. The influence of Guinier-Preston zones is a very worthy research topic, and it is also our next research direction. In future research, we will use more detection methods and analysis methods to identify and quantify all phases in the composite material to obtain better research results.