

STUDY OF ARC MELTING PROCESS VARIABLES ON THE OXYGEN CONTAMINATION OF ZR-BASED BULK METALLIC GLASS

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Zr-based bulk metallic glasses (BMG) are known to have their glass forming ability (GFA) decreased with oxygen contamination during their synthesis. In this study, we examine four synthesis variables commonly used on arc melting process: electric arc current, inert gas flow, melting time and the use of a Ti-getter. Using the statistical method of design of experiment, we created a 2^{4-1} design to identify possible significant effects among those four variables that could change the oxygen content of a Zr-Cu-Al-Nb BMG. Within 16 alloys and 48 oxygen analysis we did not find any significant effect. With these results, we were able to standardize our synthesis variables in order to achieve the lowest oxygen contamination.

Keywords: Bulk metallic glass, Oxygen contamination, Synthesis