World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:11, No:01, 2017

Investment Casting Conditions with Tourmaline In-Situ

Authors : Kageeporn Wongpreedee, Bongkot Phichaikamjornwut, Duangkhae Bootkul

Abstract : The technique of stone in place casting had been established in jewelry production for two decades. However, the process were not widely used since it was limited to precious stones with high hardness and high stabililty at high temperature. This experiment were tested on tourmaline which is semi-precious gemstone having less hardness and less stability comparing to precious stones. The experiment were designed into two parts. The first part is to understand the phenomena of tourmaline under the heating conditions. Natural tourmaline stones were investigated and compared inclusions inside stones tested at temperature of 500 °C, 600 °C, and 700 °C. The second part is to cast the treated tourmaline with ion-implanation under the stones in place casting conditions. The results showed that stones were able to tolerate as much as at 700 °C showing the growths of inclusions inside the stones. The second part of this experiment were compared tourmaline with ion-implantation and natural tourmaline using on stones in place casting process at different stone setting types. The results showed that the cracks and inclustions of both treat and natural tourmaline with stones in place casting were propagate due to high stress of metal contractions. The stones with ion-implatation were more likely tolerate to cracks and inclusion propagations inside the stones.

Keywords : stone in place casting, tourmaline, ion implantation, metal contraction
Conference Title : ICMME 2017 : International Conference on Metallurgical and Materials Engineering
Conference Location : London, United Kingdom
Conference Dates : January 19-20, 2017