

8th International Conference on Physical and Numerical Simulation of Materials Processing (ICPNS)

14–17 October 2016

Seattle, Washington | Hosted by Purdue University

SESSION 6: LIGHT ALLOYS, MARITIME HALL

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SATURDAY, OCTOBER 15, 2016

Numerical simulation for the solidification of magnesium alloy under ultrasonic

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ABSTRACT

The solidification of AZ91D magnesium alloy under ultrasonic is studied. The sound field, flow field and temperature distribution are simulated using finite element method. The sound pressure amplitude decreases with the increase of distance from probe tip face. And with influence of the acoustic streaming caused by ultrasonic, the temperature field under ultrasonic is more uniform comparing with that with normal solidification. Single bubble model is used to simulate the ultrasonic cavitation and the pressure pulse generate at the collapse time of cavitation bubble is also calculate. The effect of ultrasonic on the microstructure of AZ91D alloy cast ingot is also analyzed. And contrast experiment has also been done to verify the correctness of the numerical simulation.

KEYWORDS: ultrasonic, sound field, cavitation, solidification, magnesium alloy