

7th Annual Congress on

Materials Research and Technology

February 20-21, 2017 Berlin, Germany

Prediction of hardness, yield strength and tensile strength for single roll melt spinning of 5083 Al-alloy ribbons

Ahmad K Jassim¹ and Ali S Hammood²¹University of Basrah, Iraq²University of Kufa, Iraq

In this paper, an empirical model is applied to predict the hardness, yield strength and tensile strength of rapid solidified ribbons. The discovered empirical equation is obtained depends upon the experimental results of rapid solidification process for 5083 Al-alloys. The empirical equations predict values and describe the behavior of ribbon with consideration of ribbon thickness, grain size, hardness, yield strength and tensile strength. The experimental work involves different operation conditions and the results indicate that orifice diameter, nozzle roll wheel gap and melting temperature have direct impact on the quality of alloy. Additionally, the results showed that there is a good agreement between experimental and predicted values where the correlation coefficient is 0.99. The experiment show that there is a possibility to produce very thin ribbons with thickness in micrometer by reducing the distance between nozzle and roll wheel, and reduce the orifice diameter of casting. The hardness and yield strength will be increased due to increasing the number of small grain size in the ribbons structure and rapidly heat transfer of the small ribbons thickness. Moreover, the optimal melting temperature of this alloy is 925°C which produces high ribbon hardness compared with other melting temperature that used in this research.

Biography

Ahmad K Jassim has expertise in "Sustainable manufacturing process, non-conventional forming process, waste management, production and engineering. He has three patents in the field of Refractory Materials. He completed his BSc in Production and Metallurgical Engineering at University of Technology in Baghdad; MSc in Global Production Engineering at Technical University Berlin (Germany); and PhD in Mechanical Engineering at University of Basrah.

ahmadkj1966@yahoo.com

Notes: