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Enhancement of the mechanical properties of aluminum casting alloys (A356) by adding nano rods structures from zinc oxide

Zaid S Qassim, Murtadha A Jabbar and Jalal J Hassan
University of Basrah, Iraq

The improvement of the mechanical properties such as tensile strength, hardness and ductility is carried out in this paper by a new and developed technique in the additions field. ZnO nano rods are added to the molten of A356 aluminum casting alloys with specific weight percentages. The experimental work involves melting the scraps of cars wheels from aluminum casting alloys which are available locally inside the electrical furnace and adding the powder of ZnO nano rod manually to the graphite crucible that contain the molten of A356 and mixing the molten very well to make sure that the aluminothermic reaction between the ZnO nano rod and A356 occurred for whole molten, as a final step the molten is cast in the permanent mold and rapidly solidified by water. Tensile and micro hardness tests, microscopic and electron microscopic examinations are carried out to the obtained alloys. The results of the microscopic examinations showed that these additions acts as grain refiners after the quick solidification by making the microstructure of the modified A356 castings with ZnO nano rod have finer grains and more uniform distribution for the eutectic Si phases compared with the unmodified alloys. On the other hand, significant increase in mechanical properties such as tensile strength, elongation and hardness achieved. Furthermore, the optimal melting and holding temperature for this work is 700°C with holding time of 2 hours.

Biography

Zaid S Qassim has his expertise in Aluminum Casting Process and Mechanical Engineering. He completed his BSc in Mechanical Engineering at University of Basrah and pursuing his MSc at the same university. He is working as a Supervisor Engineer in the Oilfield at Chinese company- CPECC for maintenance and construction.

zaid.cpecc@mail.com

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