

Study on the crystallization of A356 alloy containing nanoparticles

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Abstract

A study of cast alloy A356, modified with different types of nanoparticles is carried out. SiC, AlN, TiN, clad with Cu, Ag and Al are used. The cladding is done by: currentless chemical method, extrusion of a composite rod, compression of tablets and mechano-chemical treatment in a planetary mill. The resulting nanocompositions (NCs) are introduced into the crucible of a furnace. Thereafter homogenization using an impeller is performed. Casting of the samples takes place in thin-walled steel containers. During the cooling and crystallization of the alloy the non-stationary temperature is measured. Data of temperature dependences on time has been obtained and the magnitude of overcooling with and without NCs is determined. Reduction of the overcooling and grain refinement for the samples with NCs was found, as the average grain diameter decreases from 21% to 60%. The research provide new information of the influence of NCs on the crystallisation process of alloy A356

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Biography

Pavel Kuzmanov has completed his PhD at the age of 45 years from Institute of Metal Science, Equipment and Technologies with Hydroaerodynamics Centre "Acad. A. Balevski" - Bulgarian Academy of Sciences – Sofia, Bulgaria.

He works as assistant professor in the same institute. He has published more than 10 papers in reputed journals.