Structural Characteristics of Cr-Mo Steels Microalloyed with Cerium

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The results of an experimental study on influence of cerium addition on structural characteristics of 42CrMo4 steel are presented. Alloying with cerium was carried out using profile filled with powdered mixture of mischmetal. The samples were taken from two ingots cast in the VHM's steelworks with standard time of casting of about 14 minutes. Three steel bars from one of the produced ingots were prepared by forging. Chemical composition, macro- and microstructure, X-ray EDX chemical microanalysis, hardness of the all steel samples were obtained. Cerium addition resulted in the formation of micrometer size inclusions which can be utilized for controlling the grain size structure of steel castings. The majority of the particles have settled at the bottom part of the casting, indicating that the convection flow during solidification was very weak. The cerium addition slightly diminished hardness of the steel. A segregation phenomenon causing inhomogeneous distribution of cerium over entire volume of as-cast samples after relatively rapid crystallization process of the steel was revealed.

Keywords: CrMo Steel, Cerium, Microstructure, Interaction, Microsegregation

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