CHARACTERIZATION OF NON-METALLIC INCLUSIONS AND MICRO-POROSITY IN STEEL: FORGED INGOTS, CENTRIFUGAL AND NET SHAPE CASTINGS
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ABSTRACT
Micro-porosity and non-metallic inclusions are in many cases similar in size (micron/submicron size ranges) and appearance, and both negatively affect the mechanical properties of cast steel. However these defects typically have different origins, and improving steel properties by eliminating or suppressing their negative effects poses different technological challenges. Therefore, differentiation of micro-porosity and non-metallic inclusions is practically important.

In this article, practical aspects of sample preparation and automated SEM/EDX analysis are discussed. The developed experimental procedures are applied for analysis of different industrial cast steel products including centrifugal steel casting, investment casting and ingot casting products. The observed results were compared for different steels. The possibilities of healing micro-porosity by hot plastic deformation and hot isostatic pressure treatment are also evaluated.