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Effects of Vermicular Graphite Rate on the Oxidation Resistance and Mechanical Properties of Vermicular Graphite Iron

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Abstract

The high-temperature oxidation behavior of vermicular iron with different vermicular graphite rates was analyzed at 530 °C for 0–500 h. As the vermicular graphite rate decreased, the oxidation mass gains decreased rapidly. Inside vermicular iron, graphites are interconnected coral-like channels that provide a pathway for oxygen diffusion. The oxide speed reduced with time. Graphites were the main diffusion channel for oxygen. During the oxidation procedure, pearlites were decomposed into ferrite and cementite. The tensile strength, elongation, and hardness were all reduced after oxidation.

Keywords: vermicular iron; oxidation resistance; vermicular graphite rate; oxidation mass gain

1 Introduction

Vermicular iron is a new type of engineering material with excellent comprehensive performance and higher strength, plasticity, toughness, and damping and heat conducting capabilities than gray iron. The casting performance, heat fatigue performance, and thermal conductivity of vermicular iron are superior to those of ductile iron [1–3]. Therefore, as a new type of casting material, vermicular iron is

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