

Understanding Compacted Graphite Iron Solidification through Interrupted Solidification Experiments

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While the manufacture of compacted graphite (CG) iron castings has seen significant expansion over the recent years, the growth of CG during iron solidification is still not fully understood. In this work effort was expanded to experimentally reveal the evolution of graphite shape during early solidification and its relationship to the solid fraction. To this purpose, interrupted solidification experiments were carried out on hypereutectic irons with three magnesium levels. The graphite shape factors were measured and analyzed as a function of chemical composition and solid fraction. Scanning electron microscopy was carried on to establish the fraction of solid at which the transition from spheroidal to compacted graphite occurs. It was confirmed that solidification started with the development of spheroidal graphite (SG) for all CG irons. The SG-to-CG transition was considered to occur when the spheroidal graphite developed a tail (tadpole graphite). The findings were integrated in previous knowledge to attempt an understanding of the solidification of CG iron.

Keywords: solidification, compacted graphite iron, interrupted solidification, graphite growth

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