

講演会のお知らせ

日時 2007年11月13日(火) 16:00-17:15

場所 材料開発・物性記念館 2F 研究室

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講演概要

Many modern casting processes intentionally deform alloys throughout solidification in order to reduce processing steps and increase productivity. Examples include continuous casting of steel, twin-roll casting of Al and Mg-alloy sheet, and high pressure die casting of high-integrity automotive components. In addition to playing a key role in the filling, feeding and deformation in such processes, mushy-zone rheology also directly leads to defects.

This presentation will overview the shear mechanisms operating when quiescent equiaxed microstructures containing 0-50% solid are sheared, and will explore how deformation leads to casting defects.

Experimental evidence for Reynolds' dilatancy in partially solid alloys will be presented. The role of dilatancy in semi-solid strain localisation and casting defects will then be examined. The rheology will be discussed within the framework of saturated granular materials and comparisons will be made with water-saturated sand. Mg alloy AZ91 will be used as a case-study, and the principles will briefly be extended to Al alloys. Finally, the defects created in controlled rheology experiments will be compared with rheology-related defects in industrial casting processes.

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