

PhD Opportunity with the Department of Engineering Materials and Corus

Predictions of the Behaviour of Inclusions Introduced by Alloy Impurities in Liquid Steel

The steel industry is delivering new steel grades, e.g., advanced high strength steels, with highly critical properties for high performance products, safety components etc, which require more alloying elements and also remain sensitive for inclusions, especially harmful stable inclusions. The stable inclusions may result in product failures and process problems. The sources of stable inclusions include ladle slag, ladle glaze, refractory composition, and metallurgical treatment as well as alloy impurities (contaminants), which are not well-understood. As the price of alloy additions has increased enormously steelmakers look for opportunities to reduce costs by using lower priced alloys which may contain more impurities. Therefore, there is an increasing need now to understand the effect of impurities in alloys on the behaviour of inclusion, to learn about the boundaries of impurity levels in alloys and establish their cost effective limits, and to develop tools for avoiding or limiting the amount of these inclusions to a very low degree.

This project will use a combination of laboratory experiments and characterization techniques at both the University of Sheffield and Corus Research and Development, and industrial sampling at various parts of the steelmaking route, to ultimately develop a fully coupled validated model to predict the behaviour of the inclusions introduced by alloy impurities.

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http://www.shef.ac.uk/materials/prospective_pg/mphil_phd and
<http://www.shef.ac.uk/postgraduate/research/apply>