M.A. Meshkot.

PhD Thesis. Preparation of alloys for glassy metal production.

Preliminary report.

Dr. B.S. Terry, Imperial College.

The candidate has conducted a competent study of a novel route to the production of iron-based alloys for glassy metal production. The proposed route studied is entirely novel and original and involves the in situ reduction of the relevant metallic oxide (B_2O_3) in molten iron baths. The reductants studied are carbon, ferrosilicon, silicon carbide and aluminium.

The author has shown significant experimental ability in developing and using apparatus for the small scale submerged injection of powders into liquid metal baths. The apparatus and techniques established by the author provide a real contribution to the study of pyrometallurgical reactions.

Results are reported for the small scale laboratory furnace experiments on pelletised reaction mixtures and for the plunging and submerged injection of powder mixtures in liquid baths. Significant success is demonstrated in achieving reduction of boron oxide and capture of boron in the liquid iron. These results confirm the potential route for alloy production and offer real promise for subsequent commercial exploitation.

The author includes a theoretical analysis and interpretation of his results which appear to have the potential to explain the observed kinetics of the reduction reactions but it is perhaps unfortunate that some of the assumptions regarding reagent utilisation were not validated experimentally.

In view of the experimental difficulty inherent in the nature of this study, a significant piece of work has been completed.

The thesis as submitted is of a suitable standard for the award of a PhD.