

CHAPTER X

FURTHER RESEARCH

More studies on thermal properties of slags and DRI materials should be made to provide the information necessary for further study of the DRI melting systems. The assumptions made to calculate the thermo-physical properties of materials may be verified and proper corrections be proposed.

Since the difference between the temperature of the bulk and the melting temperature of the slags employed for experimental studies on transfer of heat into the immersed particles was relatively small, the measured growth of the shell of solid slag that freezes on the particles appears to be much greater than that which solidifies in practical steelmaking slags. Further studies can be made on transfer of heat into DRI particles heated in steelmaking slags of sufficiently high temperatures that may lead to a typical set of results corresponding with the practical DRI melting system.

Effects of the shape on the rate of melting of DRI particles can be determined experimentally and included in the model. Effects of the interaction of pellets and the local evolution of gas when swarms of DRI particles are charged into a steelmaking slag on the rate of melting of DRI can be investigated experimentally and theoretically. The computer model developed can be generalized for melting of multi-particles in slags.

Effects of local gas evolution on the overall condition of the bulk slag can be investigated and substituted in the model. A simulation model can also be developed to combine the specifications of

the melting bath, the rate of consumption of the electrical power, the rate of feeding of particles, the physical and chemical properties of DRI particles, and the rate of production of steel in an electric arc furnace.