

CHAPTER THREE

OBJECTIVES

This thesis investigates the application of the iron-reduction distillation process for the recovery of zinc and iron as well as treatment some hazardous elements for a specific EAF dust obtained from Smorgon Steel Works. A detailed experimental and kinetic study of the iron-reduction distillation process was conducted with a view to developing design guidelines for industrial EAF dust treatment processes.

The objectives of this study are to :

1. characterise the mineralogy, mineral chemistry, and microtextures of Smorgon Steel Works dust. The dust used in the experiments needs to be characterised because of the large fluctuations in EAF dust compositions.
2. investigate the effect of temperature and time, reducing gas composition and sintering process in the first reduction stage of the iron-reduction distillation process. This will enable the optimum conditions to be found for use in the second reduction stage.
3. investigate the effect of temperature and time in the second reduction stage of the iron-reduction distillation process. These trials will be used to study the kinetics of this stage.
4. investigate the kinetic models for the second reduction stage of the iron-reduction distillation process.

5. determine the behavior of hazardous elements, such as cadmium, lead and chromium during the reduction.
6. determine the mineralogy of the residues of Smorgon Steel Works dust after reduction by the iron-reduction distillation process to enable classification of the residues from the process.
7. and develop design criteria for the EAF dust treatment process.



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