Hydrogen Chloride (HCl) and Sulfur Oxides (SOx) generation characteristics from Refuse Derived Fuel (DRF) incineration

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1. Introduction

The HCl generated from RDF incineration can influence on the boiler corrosion as well as the clinker which will limits the utilization of RDF to the industrial utility boiler together with other types of boiler. The generation behavior of HCl, however, is not found related to the amount of chloride and sulfur contents in RDF. In addition, not many paper have been studied the HCl generation by the types of RDF, like MSW(Municipal Solid Waste) RDF, RPF(Refuse Plastic Fuel), WCF(Wood Chip Fuels), and TDF(Tire Derived Fuels). In this paper, the HCl generation from incineration was compared to the amount of chloride contents in the RDF, and the type of RDF. It is also studied that the influence of sulfur contents in the fuel on the generation of HCl.

2. Experiments

In this study, A electronic furnace was prepare to incinerate the prepared RDF. The tested type of RDF were MSW RDFs(S-landfill site and W-city), RPFs (pelletized RPF by ring-dies, pelletized RPF by wheel-mill, semi-pelletized RPF, fluff RPF, three types of WCF, other biomass RDF, and TDF. The tested RDF were incinerated by increasing the temperature from approximately 100 C to 950 C by the 10 C. The experiment apparatus is shown in figure 1. In figure 1, the sampling line of HCl and SOx was separately composed of, and each sampling line has the volumetric gas flow meter to convert the amount of HCl and SOx captured to the emission gas concentration. The electric furnace and the other measuring instruments are shown in figure 2.

3. Results and Discussion

The results of HCl generated from RDF incineration were shown in figure 3. According to the figure 3.,

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According to the figure 3, the high chloride conversion rate was expected for the low chloride contents in the RDF, and for low chloride contents RDF, higher than 90% of the chloride in the RDF was converted the HCl in the flue gas of the incineration. According to the figure 4, the SOx conversion rate, whereas, were relative constant as 85%. The TDF, however, showed lower conversion rate as 70% due to the high sulfur content. In addition the sulfur contents in the RDF was relatively low influence on the HCl generation except the TDF. It is because that the RDF contains low sulfur to influence the HCl concentration, and the TDF contains low chloride to influence the HCl concentration.

It can be concluded that the concentration of the chloride in the RDF can influence on the HCl conversion rate, but the concentration of the sulfur is not influence the SOx conversion rate.

Reference
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