

Simplified Analytical Technology for Dioxins in Fly Ash Using Flame Ionization Detector Gas Chromatography

Abstract:

“High Clean DX” a dioxins removal technology for fly ash discharged from municipal solid waste (MSW) incinerators was developed. In the course of developing “High Clean DX,” a rapid analytical technology for the dioxins concentration in fly ash was important. A simplified analytical technology for dioxins in fly ash using flame ionization detector gas chromatography has been developed by focusing on the simple volatilization behavior of organic compounds.” This technology makes it possible to estimate the dioxins concentration of fly ash rapidly.

1. Introduction

The development of a simplified analytical technology for dioxins in fly ash is important because of the increasing demand for rapid and accurate measurement of dioxins in fly ash. In the course of developing “High Clean DX,” a rapid analytical technology for the dioxins concentration in fly ash was important. A simplified analytical technology for dioxins in fly ash using flame ionization detector gas chromatography has been developed by focusing on the simple volatilization behavior of organic compounds. This technology makes it possible to estimate the dioxins concentration of fly ash rapidly.

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2. Outline of “High Clean DX”

2.1 Process flow

The process flow of “High Clean DX” is shown in Fig. 1 and Fig. 2. The process flow is as follows: (1) Sample collection, (2) Sample preparation, (3) Measurement, (4) Data analysis.

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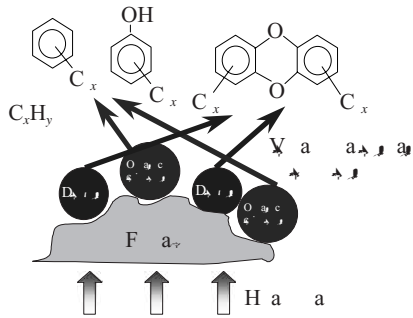


Fig.1 Principle of High Clean DX

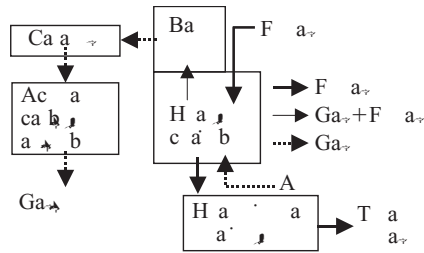
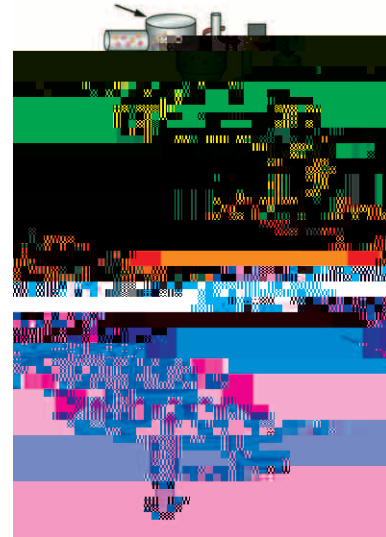


Fig.2 Flow chart of High Clean DX



The High Clean DX technology is a novel method for the treatment of fly ash. It involves the use of a fluidized bed reactor to convert the fly ash into a clean, usable form. The process is based on the principle of high-temperature treatment, which breaks down the complex organic and inorganic compounds in the fly ash into simpler, more stable forms. This process is highly efficient and can be scaled up for industrial use.

2.2 Structure of Agitating Fluidized Bed Heating Chamber

The structure of the agitating fluidized bed heating chamber is designed to ensure efficient mixing and heating of the fly ash. It consists of a cylindrical vessel with a central agitator shaft and multiple blades. The chamber is equipped with a gas inlet at the bottom, which creates a fluidized bed of the fly ash particles. The heating is provided by a jacket around the chamber, which circulates a heat transfer fluid. The entire system is controlled by a PLC (Programmable Logic Controller) to maintain precise temperature and flow conditions.

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3. Volatilization of Organic Compounds from Fly Ash

3.1 Experimental Method:

The experimental method for the volatilization of organic compounds from fly ash involves the use of a fluidized bed reactor. The fly ash is fed into the reactor, which is maintained at a high temperature. The organic compounds in the fly ash are volatilized and captured in a condenser. The remaining ash is then treated further to remove any residual organic matter. The process is highly efficient and can be scaled up for industrial use.

