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## A novel method for measuring the concentration of chloroform based on kinetic parameters at atmosphere

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### ABSTRACT

A novel method is proposed to detect chloroform concentrations based on the kinetic parameters using ion mobility spectrometer with a negative corona discharge ion source operating at atmospheric pressure. Unlike conventional sample introduction mode, in this technique,  $\text{CHCl}_3$  enters into the drift tube from the end of drift region carried by the drift gas. There are two tails before  $\text{Cl}^-$  and  $(\text{CHCl}_3)\cdot\text{Cl}^-$  ion peaks, which fit to the ions formed in the drift region. Utilizing the kinetic parameters, concentration for  $\text{CHCl}_3$  can be calculated. This method not only offers a new way to get concentrations of  $\text{CHCl}_3$  under atmospheric pressure.

**Keywords:** Chloroform; Concentration detection; volatile organic compounds; Kinetic parameters; Atmospheric pressure

### 1. Introduction

Chloroform (Trichloromethane,  $\text{CHCl}_3$ ), a kind of volatile organic compounds (VOCs), is widely used in chemical intermediates, paint, synthetic rubbers, solvent, pesticides, anesthetic and so on [1-5]. It is worth noting that inhaling  $\text{CHCl}_3$  even at low concentration can cause serious damage to cutis, kidney, liver, immune system and nervous system [6-8]. Breathing about 1000 ppm for a short time can cause headache, dizziness, nausea, vomiting and fatigue. Thus, the task to detect  $\text{CHCl}_3$  in low concentrations in environment is of great importance. Some methods such as spectroscopy [9], chromatogram [10], mass spectrum [11] and sensors [12]

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