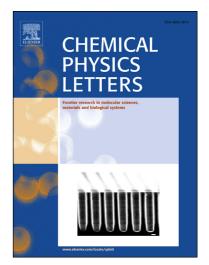
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ACCEPTED MANUSCRIPT

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, CHCl₃ enters into the drift tube from the end of drift region carried by the drift gas. There are two tails before Cl⁻ and (CHCl₃)·Cl⁻ ion peaks, which fit to the ions formed in the drift region. Utilizing the kinetic parameters, concentration for CHCl₃ can be calculated. This method not only offers a new way to get concentrations of CHCl₃ under atmospheric pressure.

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

1. Introduction

Chloroform (Trichloromethane, CHCl₃), 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 CHCl₃ 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 CHCl₃ 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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