A124 Atmosphere Pressure Glowing Discharge Ionization Source - Ion Mobility Spectrometry for OnSite Analysis of Perfume Odors

Lei Heng, Liaoning Police College, 199 Yingping Road, Ganjingzi District, Dalian, 116023, PEOPLES REPUBLIC OF CHINA*

This presentation will impact the forensic science community by application of on - site analysis of Ion Mobility Spectrometry.

The goal of this presentation is to introduce an atmosphere pressure direct current glowing discharge ion source coupled to an ion mobility spectrometer for on-site analysis of volatile organic compounds (VOCs) directly. This presentation will impact the forensic community by demonstrating a novel ion ionization source when coupled to ion mobility spectrometer will provide forensic examiners a new tool to analysis VOCs compounds which can be hardly detected by traditionally 63Ni ion source, which is quite useful for on-site analysis of perfume odors and to search for hidden flammable liquids.

Ion mobility spectrometry was developed as a technique that utilized the differences of ion mobility in electric field to separate and determine chemical substance in gas phase. The theory of ion mobility is to characterize different chemical materials based upon the mobilities of gas phase ions in a weak electric field and has been successfully used in the detection of latent traces of explosives, illicit drugs, pesticides and chemical warfare agents. In this presentation, the characteristic of a new ion mobility spectrometer is demonstrated that this is a new way for on – site analysis of odor substances

A home-made ion mobility spectrometer with direct-current glow discharge ionization source (DCGDS) was used to analyze perfume odors without any collection and concentration process, the spectrometer was built by Dalian Institute of Chemical Physics, Chinese Academy of Sciences. The analysis was performed in positive mode with following experimental conditions The drift gas flow was kept at 550 $mlmin^{-1}$ and carrier gas at 200 $mlmin^{-1}$, both of which were purified air. The electric field strength was 210 Vcm^{-1}. The temperature of the drift tube was 298 K, the atmospheric pressure was 101.3 Kpa, and the lenth of drift tube was 110 mm.

The advantages of IMS technique for gaseous material analysis are simple and convenience, so the sample inlet part of the method is very import. There are many inlet methods, like syringe sampling, or inhale the gas sample directly to the IMS instrument with a pump, a small sampling pump was used in this study.

The types of perfume can be identified by reduced mobility value K_0 and peak characteristics, which are obtained from the positions of ion fragment peaks and intensity; and the characteristics of different types of perfume can also be identified.

In summary, the ion mobility spectrometry with glow discharge ionization source is an effective technique in the perfume odor detection on site or in laboratory, it also will be a new way of gas sample analysis and a new solution to collect and analyze the odor material evidence on scene.

Ion Mobility Spectrometry, Odors, Identification

 ** Presenting Author*