

Stable Carbon Isotope of PAHs from Typical Emission Sources in China

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Introduction

Polycyclic aromatic hydrocarbons (PAHs), a class of ubiquitous organic contaminants, derive mainly from the incomplete combustion or pyrolysis of organic materials. Compound-specific isotope analysis (CSIA) is a useful tool for identifying sources of PAHs. The measurement of the ratio of stable carbon isotopes ($\delta^{13}\text{C}$) of individual PAHs can be used to identify their origin. This paper documents the compound-specific carbon isotope composition of individual PAH congeners in smoke particles from typical PAH emission sources, including residential stove burning of biofuel and coal and vehicular exhaust of gasoline and diesel vehicles.

Discussion of Results

$\delta^{13}\text{C}$ values of individual PAH ranged from -30.6‰ to -19.8‰ (Fig. 1). Smoke from biofuel burning showed lower $\delta^{13}\text{C}$ values, whereas gasoline vehicle exhibited relatively higher $\delta^{13}\text{C}$ values. Result suggested that emission from fossil fuels combustion can lead to relatively higher $\delta^{13}\text{C}$ values than biomass combustion. The $\delta^{13}\text{C}$ of PAH congeners from these typical sources can provide scientific information on PAH source identification.

