ARE [NITROPOLYCYCLIC AROMATIC HYDROCARBON]/[POLYCYCLIC AROMATIC HYDROCARBON] RATIOS INDICATORS FOR CONTRIBUTORS OF AIRBORNE PARTICULATES ?

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[INTRODUCTION] Several polycyclic aromatic hydrocarbons (PAHs) and nitropolycyclic aromatic hydrocarbons (NPAHs) are not only carcinogenic/ mutagenic but also endocrine disrupting pollutants. Atmospheric NPAHs mainly originate from imperfect combustion of organic matter such as coal and petroleum and are formed in the atmosphere by heterogeneous or homogeneous reactions of their parent polycyclic aromatic hydrocarbons (PAHs) with NOx and OH radicals. Additionally, the concentrations of NPAHs in exhausts increase with the increase in the combustion temperature. For the effective countermeasures, it is important to know the main contributors to urban airborne particulates that contain high concentrations of PAHs and NPAHs. The purpose of this report is clarify whether [NPAH]/[PAH] ratios in particulates are useful indicators or not for identifying the origins. [EXPERIMENTAL] Exhaust particulates were collected from automobiles and heating facilities using coal, wood and oil. Airborne particulates were collected in several cities in China, Russia, Korea and Japan. NPAHs and PAHs in particulates were determined by HPLC methods with chemiluminescence and fluorescence detections, respectively. [RESULTS AND DISCUSSION] Several [NPAH]/[PAH] ratios, such as [6-nitrobenzo[a]pyrene]/[benzo[a]pyrene], [6-nitochrysene]/[chrysene] and [1-nitropyrene]/[pyrene], showed larger values in diesel-engine exhaust particulates than those in coal-burning stove exhaust particulates by the factor of one order of magnitude or more. These [NPAH]/[PAH] ratios also showed differences between particulates collected in different cities in East Asian countries, suggesting the difference of energy sources. [CONCLUSION] The [NPAH]/[PAH] ratios are useful indicators for identifying the main contributors of suspended particulate matters in urban air.