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Trace Analysis of Polycyclic Aromatic Hydrocarbons Using Gas Chromatography–Mass Spectrometry Based on Nanosecond Multiphoton Ionization

Adan LI[1)2)], Tomohiro UCHIMURA[1)3)], Hiroko TSUKATANI[4)] and Totaro IMASAKA[1)3)]

1) Department of Applied Chemistry, Graduate School of Engineering, Kyushu University
2) College of Chemistry and Environmental Engineering, Yanshan University
3) Division of Translational Research, Center for Future Chemistry, Kyushu University
4) Fukuoka Institute of Health and Environmental Sciences

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Gas chromatography/resonance-enhanced multiphoton ionization/time-of-flight mass spectrometry (GC/REMPI-TOFMS) using an ultraviolet nanosecond laser was employed in the trace analysis of polycyclic aromatic hydrocarbons (PAHs). A standard sample that contained 16 PAHs on the priority list of the Environmental Protection Agency of the United States of America (U.S. EPA) was measured. A sample of river water that had been pretreated by means of solid-phase extraction was analyzed by GC/MS based on electron impact ionization (EI) and REMPI to evaluate the performance of the analytical instrument. The results suggested that REMPI is superior to EI for soft ionization, and suppresses the background signal due to aliphatic hydrocarbons. Thus, GC/REMPI-TOFMS is a more reliable method for the determination of PAHs present in the environment.

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