Occurrence and photostability of 3-nitrobenzanthrone associated with atmospheric particles

The occurrence and photostability of 3-nitrobenzanthrone associated with atmospheric particles has been investigated at a semi-rural sampling location. A total of seventeen 24-h samples and fourteen 12-h samples were analyzed for their content of 3-nitrobenzanthrone. 3-Nitrobenzanthrone was unambiguously detected in one-fourth of the samples in the lower pg m\(^{-3}\) range (mean = 17.1 +/- 14.8 or 9.8 +/- 4.2 pg m\(^{-3}\) excluding one high value), but in the majority of the samples no signal due to 3-nitrobenzanthrone was observed. By comparison with the levels of nitrated polycyclic aromatic hydrocarbons (nitro-PAHs) and other air pollution components, it is suggested that 3-nitrobenzanthrone is a directly emitted primary pollutant and that it is not formed in the atmosphere to a significant degree.

The photodegradation of 3-nitrobenzanthrone was studied in order to understand the low levels of this compound in ambient air. In the presence of a radical sensitizer, anthraquinone, the degradation rate of 3-nitrobenzanthrone is comparable to that of 1-nitropyrene (NP), a directly emitted nitro-PAH present in ambient air in significantly higher levels than 3-nitrobenzanthrone. The rate of direct photolysis is slightly smaller than that for 1NP. The conclusion of this study is that the dominant sources of 3-nitrobenzanthrone are unidentified combustion processes from which it is emitted in relatively small amounts. Accordingly, 3-nitrobenzanthrone should mainly be considered a health problem at locations close to these sources. (C) 2002 Elsevier Science Ltd. All rights reserved.