



Degradation of nine nitrosamines in water by ultraviolet irradiation

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ABSTRACT

Ultraviolet (UV) degradation of nine nitrosamine (NA) species was investigated. Four UV lamps were used for the experiment: a KrCl excimer lamp with an emission peak at 222 nm (222-EX); a low-pressure mercury lamp with a peak at 254 nm (LP); a filtered medium-pressure mercury lamp with the emission range narrowed to 230–270 nm by an optical filter; and an XEFL lamp with the emission range narrowed to 220–280 nm. Solutions of the nine NAs were exposed to one of the four UV lamps. Water was sampled in time series, to investigate degradation of NAs. As an overall trend, the degradation rate was slightly slower with the LP lamp than with the other lamps, especially the 222-EX. The degradation of cyclic NAs (*N*-nitrosodiphenylamine, *N*-nitrosopyrrolidine, *N*-nitrosopiperidine [NPIP], and *N*-nitrosomorpholine) was dependent on the tested lamp, and the highest degradation of NPIP was observed. Among non-cyclic NAs, degradation appeared to be faster as the carbon chain length increased from *N*-nitrosodimethylamine (NDMA) to *N*-nitroso-di-*n*-butylamine. Of the nine NAs, NDMA was one of the most persistent species.

Keywords: Mercury UV; Mercury-free UV; Nitrosamines; Xenon; KrCl

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