Apr 23rd, 9:00 AM - 4:00 PM

The Photolysis of Nitrite

Deborah A. Cull
Illinois Wesleyan University

Timothy R. Rettich, Faculty Advisor
Illinois Wesleyan University

THE PHOTOLYSIS OF NITRITE.

Deborah A. Cull and Timothy R. Rettich*, Department of Chemistry, IWU

The photolysis of the nitrite ion, NO_2^-, yields the free radicals nitric oxide, NO, and hydroxyl radical, OH. It has been found by Treinin and supported in this laboratory that no net reaction occurs when nitrite is photolyzed in pure water. Zafiriou has extensively studied the solar photolysis of nitrite-containing seawater, and has detected increased partial pressures of NO during the day, as well as decreased nitrite concentrations, which both suggest that the photolysis of nitrite occurred.

In pure water, the OH and NO radicals produced from the photolysis of NO_2^- presumably recombine and ultimately reproduce NO_2^-. In the presence of benzene, a known radical scavenger, this process is interrupted and net photolysis of nitrite is observed. This particular scavenging process is of primary interest to this research. Aqueous nitrite saturate with benzene has been photolyzed at 366nm. The effect of varying the pH as well as the solvent for maximal extraction of the scavenger product has been studied. Ideally, the identity of the product will be obtained, leading to the quantification of the scavenging process. The reaction has been monitored both spectrophotometrically as well as by a nitrite-specific electrode. In addition to the photochemical reaction, the thermal reaction of nitrite in the presence of benzene has been tested. The scavenging of the hydroxyl radical by benzene has been studied by producing OH via hydrogen peroxide and a catalyst. Long range goals include the determination of the quantum yield with respect to nitrite disappearance, with the results applied to the photolysis of nitrous acid, a process that occurs in polluted atmospheres.