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PHOTOCHEMICAL REACTIONS OF MOLECULAR NITROUS ACID IN BENZEN

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At the Earth's surface, radiation of wavelengths 290 nm and greater (actinic region) is available for inducing photochemical reactions. The term “photochemical” air pollution reflects the essential role of solar radiation in driving the chemistry. These photochemical reactions involve volatile organic compounds (VOCs) and nitrogen oxides (NOx). The complex chemistry of VOCs and oxides of nitrogen lead to the formation of various oxidizing species such as ozone, O₃, and the highly reactive hydroxyl radical. In this research, the photochemistry of molecular nitrous acid in the presence of benzene scavenger was studied. Nitrous acid is of special interest because it leads to the production of O₃ and hydroxyl radical. Cox and Atkins¹ first studied the photochemical reactions of nitrous acid in 1973 using 330 nm to 380 nm light. However, in our research, by studying the photochemistry of nitrous acid in a matrix composed of 100% benzene scavenger, many side-reactions of nitrous acid such as equilibrium reactions with NO₂⁻ and N₂O₃ that exist in aqueous solutions become inconsequential. This allows for a detailed study of the reactions between benzene, a VOC, and the photochemical products of nitrous acid. The results and data are reported here.