

Discussion Problem

The following text was extracted from a paper published on “The Mechanism of Aromatic Iodination by Iodine and Nitric Acid” (Ref: *J. Chem. Soc. B*, 1971, 2264 - 2268, DOI: 10.1039/J29710002264). Provide the complete Lewis structure for each species in equations (1) - (4). ArH is *m*-xylene whose structure is provided. The structure of the product, ArI, is also provided.

Kinetics of the iodination of a number of substituted benzenes by iodine and nitric acid in acetic acid solution have been studied. The reaction is catalysed by dinitrogen tetroxide and hydrogen ions and evidence is presented to show that the iodinating species is protonated NO_2I , which reacts in a slow step with the aromatic compound. Acidity function data for nitric acid in 10% aqueous acetic acid are presented and charge-transfer complex formation between iodine and *m*-xylene in acetic acid has been studied.

The only scheme which accommodates all the experimental observations is that shown by reactions (1)–(4).

