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Measurement of the Rate Constant of the Reaction of Methoxy (CH_3O) With Nitrogen Dioxide (NO_2). MICHAEL E. KING, PRABHAKAR MISRA, Howard University*, Washington, DC. Time-resolved laser induced fluorescence (LIF) was used to measure the decay of excited methoxy radicals resulting from their reaction with NO_2. In a flow cell arrangement, the 248 nm (KrF) line of an excimer laser photolyzes the methyl nitrite (CH_3ONO) in a gaseous mixture also containing NO_2 and N_2. The methoxy radicals produced by the photolysis were excited by absorption of photons from a frequency-doubled dye laser (pumped by a frequency-doubled Nd:YAG laser) that was resonantly tuned to the 293 nm $X \rightarrow A$ transition. The excited radicals relax to the ground state primarily by fluorescence (at the total pressure chosen). The fluorescence intensity was measured by a photomultiplier tube positioned at right angles to the collinear pulsed laser beams. By continuously sweeping the delay between the firing of the two laser pulses and measuring the fluorescence intensity with a boxcar integrator immediately after the dye laser pulse the decay of the methoxy radical concentration was directly measured. This decay curve was measured at a variety of reaction zone temperatures (25 °C - 250 °C) and partial pressures and by regression analysis the decay time from the curve was determined. The reaction rate constant was calculated and an Arrhenius plot of the reaction rate constant and Stern-Volmer plots were generated from the measured data. *Financial support from NASA/CSTEA (#NAGW-2950) , EPA (#R819720-01-2) and NASA Lewis (#NAG3-1677) is gratefully acknowledged.

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