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Chemical Production of Vibrationally Excited Carbon Monoxide from Carbon Vapor and Molecular Oxygen Precursors KRAIG FREDERICKSON, BEN MUSCI, J. WILLIAM RICH, IGOR ADAMOVICH, Ohio State Univ - Columbus — Recent results demonstrating the formation of vibrationally excited carbon monoxide from carbon vapor and molecular oxygen will be presented. Previous reaction dynamics simulations and crossed molecular beam experiments have shown that gas-phase reaction of carbon atoms and molecular oxygen produces vibrationally excited carbon monoxide. The present work examines the product distribution of this reaction in a collision dominated environment, at a pressure of several Torr. Carbon vapor is produced in an AC arc discharge in argon buffer operated at a voltage of approximately 1 kV and current of 10 A, and mixed with molecular oxygen, which may also be excited by an auxiliary RF discharge, in a flowing chemical reactor. Identification of chemical reaction products and inference of their vibrational populations is performed by comparing infrared emission spectra of the flow in the reactor, taken by a Fourier Transform IR spectrometer, with synthetic spectra. Estimates of vibrationally excited carbon monoxide concentration and relative vibrational level populations will be presented.

Kraig Frederickson
Ohio State Univ - Columbus

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