# FTIR ANALYSIS OF FLOWING AFTERGLOW FROM A HIGH-FREQUENCY SPARK DISCHARGE

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Plasmas are often used as ionization sources for ambient mass spectrometry (AMS). Here, the flowing afterglow of a novel high-energy spark discharge system, operated in nitrogen at high repetition rates, is investigated as a source for AMS. The spark discharge here is the same as that of an automobile ignition circuit.Combustion in automobile engines is initiated by a spark ignition system that is designed to deliver short-duration,high-voltage sparks to multiple engine cylinders. The arrangement utilized in this study is a modified discharge configuration designed to produce similarly short-duration, high-voltage discharges. It consists of an automotive ignition coil that is activated by a spark initiation circuit that discharges in turn into a cell with neutral gas input flow and ultimately into the collection orifice of a mass spectrometer. The discharge voltage is approximately 40kV at 800 Hz. High-frequency spark discharges in a nitrogen flow produce reagent ions such as NO+. In order to better evaluate the effectiveness of the discharge in producing reagent ions, an FTIR is utilized to measure IR active species such as nitric oxide, hydroxide, ozone, and water in the afterglow of the spark discharge during variation of discharge parameters. Time-resolved IR emission spectra provide additional insight into the reagent ion production mechanisms.