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**Dissociative ionization of JP-10 in a cross-flowing Ar/Xe plasma expansion** CHARLES JIAO, UES, Inc, BISWA GANGULY, ALAN GARSCADDEN, Air Force Research Laboratory — JP-10 ( $C_{10}H_{16}$ ), a synthetic fuel composed almost exclusively of exo-tetrahydrodicyclopentadiene, has been widely used in missiles, supersonic-combustion ramjets and pulse-detonation engines. Although many combustion research studies have been carried out on JP-10, its detailed combustion mechanism remains to be explored. As plasma-assisted ignition and combustion have been of great interest in recent years, and topics on the roles played by charged species in ignition/combustion are being revisited, it is appropriate to study charged particle collisions with the fuel molecule. Previously we have investigated the electron impact ionization of JP-10. In the current study we examine the formation of ion fragments from JP-10 by adding the fuel to a nozzle-formed expansion of Ar or Xe plasma. Dependences of fragment ion intensities on the rf-power will be presented. Mechanisms for the ion formation will be discussed based on the interpretation of the ion intensity profiles showing both exothermic and endothermic characteristics, and on results from additional measurements including optical emission and plasmas with Ar/N<sub>2</sub> mixtures in the same configuration.

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