

Hot Nozzles & Cold Beams: Revealing Ion Chemistry, Solvation, & Combustion

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Tunable vacuum ultraviolet radiation generated at a synchrotron provides a universal, yet selective scalpel to decipher molecular information in complex chemical systems when coupled to mass spectrometry. Used in conjunction with theory, this provides profound insight into proton transfer mechanisms, solvation and electronic structure in organic molecules and clusters. New results from in-source molecular beam ionization of water and methanol leading to nucleation and ion induced chemistry mediated via proton transfer will be presented. I will also discuss the use of a novel microtubular reactor (The Chen Source) to follow model mechanisms relevant to the formation mechanisms of polycyclic aromatic hydrocarbons (PAHs), and PANHs (Nitrogenated Hydrocarbons) and oxidation in hydrocarbon-based combustion processes. These studies are being extended to probe the energy transfer processes that occur in these heated reactors using velocity map imaging in conjunction with synchrotron radiation.

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