A New Discharge Nozzle for Spectroscopic Studies in Supersonic Jets

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We will describe a new nozzle for spectroscopic studies of reactive species in pulsed supersonic jets. This nozzle was designed as a cheap alternative to laser ablation methods for producing metal- containing species. It employs an electrical discharge to produce metal atoms by argon ion sputtering at the cathode. These metal atoms can then be mixed with the appropriate reagents to produce metal- containing species before expansion into vacuum. To avoid rapid carbon deposition onto the metal source electrode when carbon-containing reagents are used, the reactive precursor must be kept away from the metal-sputtering region. Consequently, a dual channel nozzle has been developed in which two pulsed gas sources are mixed at a common point prior to expansion. This has been extensively tested by preparing a number of spectroscopically well-characterised metal- containing species, including PtC, $CdCH_3$, and ZnC_5H_5.