Polycyclic aromatic hydrocarbons (PAHs) are abundant organic molecules detected in several objects in the universe, such as molecular clouds in the interstellar medium (ISM)\(^a\). Their structure can be modified through plasma-driven processes occurring in the ISM. The present study focuses on the dissociation of naphthalene (C\(_{10}\)H\(_8\)) in a radiofrequency (RF) plasma, probed using cavity ringdown spectroscopy (CRDS) in the near-infrared. Namely, the low-power RF plasma source, called Platypus, is adapted from a small plasma thruster (“Pocket Rocket”) designed by the Space Plasma Power and Propulsion laboratory of the ANU\(^b\). A stable supersonic jet plasma is generated by expanding a mixture of argon and dissociated C\(_{10}\)H\(_8\) into a vacuum chamber through a 20 mm long, 4 mm wide slit nozzle\(^c\). The jet-cooled fragmented C\(_{10}\)H\(_8\) is finally probed with the ultra-sensitive CRDS technique. We recorded a spectrum from 5950 to 6120 cm\(^{-1}\) composed of several hundred transitions originating from many different molecules, radicals, and probably ions\(^d\).

\(^d\)M. Alliati et al., The Journal of Physical Chemistry A 123.10, 2107-2113 (2019).