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Optimization of plasma ionization sources for ambient mass spectrometry surface analysis KIRSTY MCKAY, JUN-SEOK OH, ANDREW BOWFIELD, University of Liverpool, TARA SALTER, National Physical Laboratory, JAMES WALSH, University of Liverpool, IAN GILMORE, National Physical Laboratory, JAMES BRADLEY, University of Liverpool — The use of low-temperature atmospheric pressure plasma sources in ambient surface analysis mass spectrometry has received growing interest in recent years. Due to their unique chemical and electrical properties plasmas provide a gentle and efficient means of ionizing surface compounds in their natural environment, with little to no sample preparation required. In this study we investigate how these plasma ionization sources might be optimized for ambient surface analysis techniques. An ambient molecular beam mass spectrometer from Hiden Analytical Ltd. (HPR-60) is used to monitor the charged ion species emanating from two different plasma sources, a pulse modulated RF (13.56MHz) plasma needle and a continuous wave kHz plasma jet, under different operating parameters. Both time-averaged and time-resolved ion intensity measurements reveal the species present in the discharges and the underlying production and loss mechanisms for different operating conditions. To assess the effectiveness of each of these plasmas sources as tools for surface ionization/desorption, a number of different pharmaceutical and polymer surfaces were analyzed in both positive and negative ion mode using a hybrid linear trap quadrupole (LTQ) orbitrap mass spectrometer, due to its increased mass sensitivity.

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