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**Low-Pressure Microwave Excited Microplasmas as Sources of VUV Photons and Metastable Excited Atoms: Experimental Measurements** JAMES COOLEY, JUN XUE, Agilent Technologies, RANDALL URDAHL — Microplasma discharges are typically operated at high pressure due to pd scaling. However, there are a number of potential applications for which lower pressure operation offers advantages. These applications, including spatially precise surface processing, treatment of soft materials, and chemical analysis, require energetic plasma products such as excited state species, VUV photons, or high-energy ions while taking advantage of the small size and high specific power a microdischarge offers. To this end, microwave-excited microplasma sources in rare gases operating at pressures of $< 10$ Torr are being developed. The microplasmas are sustained in ceramic cavities having cross sectional dimensions of $\leq 1$ mm, excited by a split-ring resonator antenna operated at 2.45 GHz at power levels of a few W. Experimental measurements, focused on the production of energetic plasma products, will be discussed. These will include emission spectroscopy, photodiode measurements of total VUV emission, diode laser absorption measurements of excited-state densities, and measurements of electron density through RF reflectometry. The effects of varying gas flow rate, composition, and RF power will be explored.

James Cooley
Agilent Technologies

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