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Radical Production in a Short-Pulse Excited, Flowing Gas Atmospheric Pressure Dielectric Barrier Discharge J.M. WILLIAMSON, P. BLETZINGER, D.D. TRUMP, Innovative Scientific Solutions, Inc, B.N. GANGULY, Air Force Research Laboratory — The production of plasma-chemical radicals in a short-pulse excited atmospheric pressure Ar / H_2O or He / H_2O dielectric barrier discharge as a function of gas flow rate and H_2O concentration was investigated. The plasma emission of excited Ar, He, OH, and N_2^+at 750, 706, 308,and 391 nm, respectively, were recorded for various flow conditions and H_2O concentrations as well as applied voltage. The change in plasma emission with different conditions was measured either by temporally integrated dispersed emission with a spectrometer/CCD or temporally resolved, wavelength selected emission with a spectrometer/gated PMT. The OH radical production increased with applied voltage and also with small additions of water but the emission was greatly reduced with higher water concentrations. The temporally-resolved OH and N_2^+ emission was delayed with respect to the excited Ar and He emission due to the heavy particle production of OH and N_2^+. The radical production as function of applied voltage, gas flow rate, and gas mixture will be presented.

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