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Characterization of Particle Emission in Atmospheric Pressure Plasma DC glow[1] YAO KOVACH, University of Michigan - Ann Arbor, ZHEHUI WANG, Los Alamos National Laboratory, JOHN FOSTER, University of Michigan - Ann Arbor — Atmospheric pressure plasmas are currently being investigated for a number of applications ranging from wound healing to water purification. A particular class of these discharges is the 1 atm DC glow with liquid anode. Previously, when ferric chloride solution was applied as anode electrolytes, a luminous particle emission has been observed with a trajectory phenomenon at 100 mA. However, the mechanism of particle emission from the liquid anode still remaining study. Recently, three types of particle emission processes have been demonstrated using a high speed image camera with the exposure rates up to 30k frames per seconds. Besides the particle emitted from the local interface on liquid anode, it is observed that the particles emitted downward from the cathode while a bright cathode spot was existing. Particle emission was also initiated in the plasma column. In this type, an interesting explosion activity with a ball shaped structure in gas-liquid phase which formed after the explosion was explored. The characteristics of each emission was summarized and compared with their time resolved measurements. Importantly, these different typed particle emissions and associate plasma behaviors might give rises to enhance the study in dusty plasma related physics.

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