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Synthesis of graphene quantum dots by DC atmospheric pressure microplasma jets: the influence of polarity[1] THOMAS ORRIERE, DAVID PAI, Institut P' - Universite de Poitiers, DARWIN KURNIAWAN, YI-CHEN CHANG, WEI-HUNG CHIANG, National Taiwan University of Science and Technology — Our presentation deals with the graphene quantum dots production by an atmospheric pressure microplasma jet and its optimization. A metallic pipe on which a DC voltage was applied was facing a liquid solution containing Sodium Dodecyl Sulfate (SDS) connected to ground via a platinum electrode. We used photoluminescence and Raman spectroscopy to characterize the GQDs and UV-visible absorption to compare the GQD production yields. Optical emission spectroscopy and electrical passive probes were employed to characterize the discharges. We focus our study on the polarity applied to the jet. The positive and the negative polarities leads to two different discharge regimes leading themselves to several GQD production yields. The positive discharge, which produces more GQDs, shows unstable current waveforms, a constant emission intensity with time, and the emission of the $H_\alpha$line. The negative discharge shows a stable current, a decreasing emission intensity with time, as well as more intense molecular spectra compared to atomic lines. The reaction mechanisms were investigated by adding H_2O_2 which is a solvated electron scavenger. The results show that the reaction mechanism is not the same for both polarities.

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