**SolarPlas - Solar powered atmospheric plasma system for the treatment of contaminated wastewater**

Atmospheric plasma (AP) is envisioned as a revolutionary green technology for wastewater treatment as compared to conventional biological and advanced oxidation processes due to its robust performance in degrading recalcitrant emerging contaminants and micropollutants. AP powered by DC, AC, or pulsed power sources, in the air or in contact with water produces a multitude of reactive species able to attack and ultimately mineralize the contaminants dissolved in water. Salient features of this novel technology include operation at NTP, flexibility, rapid startup, in situ generation of reactive species (e.g. H2O2, O3, ˙OH, ˙NO, NO2˙) without chemical addition which makes it a futuristic green technology. However, an inherent disadvantage is its high energy cost which hinders its large scale application; only a few examples of treatment of real water samples are indeed reported. Previous research on AP application for emerging contaminant removal also lacks in designing and selecting a plasma discharge capable of treating surfactant and non-surfactant types of emerging contaminants efficiently. Therefore the objectives of this proposal include the development and testing of a standalone solar-powered dual discharge plasma reactor (SolarPlas) for sustainable wastewater treatment targeting efficient removal of emerging contaminants of surfactant and non-surfactant nature. The dual discharge will consist of 1) plasma in contact with liquid at the gas-liquid interface for destroying surfactant type of emerging contaminants while 2) plasma discharge at the bottom of the reactor diffused through the air bubbling will effectively degrade non-surfactant type of emerging contaminants from Hospital wastewater and landfill leachate. The main outcome of the project will be in the form of an efficient solar-powered AP reactor (SolarPlas) for wastewater treatment with defined energy efficiency for the treatment of various types of wastewater matrices (municipal, industrial etc.).

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