

PW-P006

Characteristics of Nonthermal Plasma Source in Various Liquids

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Recently non-thermal plasma has been frequently applied to various research fields. The liquid plasma have received much attention lately because of interests in surgical and nanomaterial synthesis applications. Especially, intensive researches have been carried out for non-thermal plasma in liquid by using various electrode configurations and power supplies. We have developed a bioplasma source which could be used in a liquid, in which outer insulator has been covered onto the outer electrode. Also we have also put an insulator between the inner and outer electrode. Based on the surface discharge mode, the nonthermal bioplasma has been generated inside a liquid by using an alternating current voltage generator with peak voltage of 12 kV under driving frequency of 22 KHz. Here the discharge voltage and current have been measured for electrical characteristics. Especially, We have measured discharge and optical characteristics under various liquids of deionized (DI) water, tap water, and saline by using monochromator. We have also observed nitric oxide (NO), hydrogen peroxide (H₂O₂), and hydroxyl (OH) radical species by optical emission spectroscopy during the operation of bioplasma discharge inside various kinds of DI water, tap water, and saline. Here the temperature has been kept to be 40 °C or less when discharge in liquid has been operated in this experiment. Also we have measured plasma temperature by high speed camera image and density by using either H-alpha or H-beta Stark broadening method.

Keywords: Discharge in liquid, Bio-plasma, Plasma life science

PW-P007

대기압에서 리모트 유형의 RF DBD를 이용한 Si 에칭 특성 분석

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Multi-crystal Silicon wafer를 대기압에서 리모트타입의 RF-DBD를 이용하여 에칭을 하였다. DBD소스의 전극으로 알루미늄을 사용하였고 유전체로는 알루미늄을 사용하였다(전극 갭을 기록). 전원공급은 13.56 MHz RF 전원장치를 이용하였으며 아르곤과 SF₆ 유량을 변수로 하여 실험하였다. Ar 유량은 2~10 slm, SF₆는 0.2~1 slm으로 변화를 주어 최적화 조건을 찾았다. 결론적으로 SF₆의 유량이 증가할수록 Si 에칭율이 증가하였다. 그러나 SF₆의 유량이 2 lm일 때 에칭율이 감소하였다. 그리고 scan time이 45초일 때 2.3 μm/min로 최대 에칭율을 얻었다.

Keywords: RF DBD, Etching