



AAPPS-DPP 2018 Plenary speaker Name: Prof. Yi-Kang Pu

Affiliation: Department of Engineering Physics, Tsinghua University

Rationale: He has been carrying out excellent research in plasma physics area, particularly, in the field of atomic and molecular processes in low-temperature plasmas. He published more than 100 scientific papers in this field and his *h*-index is 23 at Feb 2018. He is famous in the low-temperature plasma area for his study about excitation kinetics and spectroscopic examination of non-equilibrium plasmas.

Talk Title: The influence of electrode surface condition on the discharge properties in a capacitively coupled plasma

Short abstract: In this presentation, we report recent experimental results on the time evolution of emission intensities in a capacitively coupled argon/krypton discharge, during a time period when the surface condition of the powered electrode is changing. The powered electrode, made of aluminium, initially has an oxide layer of a few nanometers in thickness, which is being removed during the discharge by argon ion bombardment. While the oxide layer being sputtered off, we observe a change of discharge characteristics over a time scale of hundreds of seconds. By using the rate balance equation of several argon excited species, the global discharge model and an equivalent circuit model, we study the effect of this sputtering process on the discharge characteristics. In particular, the change of the following quantities and the correlations among each other will be investigated: density of excited state, the variation in the absorbed power, electron density, density of sputtered materials, the secondary electron yield of the powered electrode, the sheath thickness and the density of argon metastables. The results from the models are compared with that observed in the experiment.

List of related published papers

1. “Determining the electron temperature and the electron density by a simple collisional-radiative model of argon and xenon in low-pressure discharges”, Xi-Ming Zhu, Wen-Cong Chen, Jiang Li and Yi-Kang Pu, *Journal Of Physics D-Applied Physics*, **42**, 025203, (2009)
2. “Effect of the reactor surface roughness on benzene oxidation in dielectric barrier discharges”, Jing Li, Shi-Tong Han, Shu-Pei Bai, Xi-Cheng Shi, Su-Ling Han, Hua Song, Xi-Ming Zhu, Wen-Cong Chen and Yi-Kang Pu, *Plasma Sources Science and Technology*, **17**, 045015, (2008)
3. “Optical Emission Spectroscopy Investigation of a Surface Dielectric Barrier Discharge Plasma Aerodynamic Actuator”, Li Ying-Hong, Wu Yun, Jia Min, Zhou Zhang-Wen, Guo Zhi-Gang and Pu Yi-Kang, *Chinese Physics Letters*, **25**, 4068 (2008).
4. “Large-Scale Production of Amorphous Silicon Oxynitride Nanowires by Nickel-Catalyzed Transformation of Silicon Wafers in NH₃ Plasma”, Jie Zheng, Xubo Song, Xingguo Li, and Yikang Pu, *Journal Of Physical Chemistry C*, **112**, 27, (2008)
5. “Gas temperature, electron density and electron temperature measurement in a microwave excited microplasma”, Xi-Ming Zhu, Wen-Cong Chen, and Yi-Kang Pu, *Journal Of Physics D-Applied Physics*, **41**, 105212, (2008).