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Time resolved investigations of hydrogen DFC-CCP plasma sheaths in afterglow discharge CEZAR-MIHAI GAMAN, ALBERT R. ELLINGBOE, Dublin City University, Ireland — This paper reports the results of time resolved measurements of ion energy distribution function in an afterglow discharge for a hydrogen DFC-CCP (dual-frequency confined capacitively coupled plasma). The experiments were carried out in the CIRIS device which consists of two flat, parallel-plate electrodes. The plasma is confined in the volume between the powered and grounded electrodes by a quartz tube, which shields the plasma from the grounded chamber walls, resulting in a symmetric discharge. In the grounded electrode is mounted a energy resolved mass spectrometer. The experiment was performed in a dual frequency mode (2~Mz and 27.12 MHz). The pressure range was 5 – 25 Pa and the working domain of the power of radio frequency in on phase was 15 – 150 W. We have measured IEDFs (Ion Energy Distribution Functions) of the dominant ion in this discharge – H_3^+ , in the afterglow with steps of 1 μs . Further into the afterglow, we find that the sheath potential does not fully collapse to zero, and, after a transient phase, a constant ion energy of about 5 eV is maintained. This suggests that the electron temperature does not full collapse in the afterglow, but is maintained at approximately 1 eV.

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