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Plasma monitoring by transition in intensities of the forbidden atomic Oxygen spectral lines VLADIMIR MILOSAVLJEVIC, School of Physics & NCPST, DCU, Ireland/Faculty of Physics, University of Belagrde, Serbia, ALEKSANDRA JESENKO, Faculty of Pharmacy, University of Belgrade, Serbia, ZORAN SIMIC, LUKA C. POPOVIC, Astronomical Observatory, Belgrade, Serbia — The intensity of forbidden atomic oxygen spectral lines at 630.0 nm, 636.3 nm, 297.23 nm and 557.73 nm to establish a threshold for actinometry is analyzed. Actinometry suffers from signal masking by molecular species due to molecular dissociation and trace gas emission. To establish the threshold for actinometry we monitor the emission of forbidden spectral lines and search for "phase transition" in the intensities of forbidden spectral lines. Concurrently the forbidden spectral line is used for determination of the main plasma parameters too. This work develops the method based on OES as a non invasive technique for quantifying complex chemistry which has direct application in plasma processing in semiconductor and other industries. The challenge in this case lies in the complex plasma chemistry that is commonly used in surface treatment and the constraint of applying intrusive sensors to industrial plasma reactors. These constraints make OES ideal for industrial use, however interpreting the spectra and extracting useful information is the challenge. This work is done with ICP 13.56 MHz RF plasma discharge at pure oxygen, as well at oxygen–argon–hydrogen mixture.

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