

Abstract Submitted
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The validation of oxygen optical actinometry using laser-induced fluorescence SAMIR KECKAR, JIM CONWAY, PAUL SWIFT, STEPHEN DANIELS, Dublin City University, NATIONAL CENTRE FOR PLASMA SCIENCE AND TECHNOLOGY TEAM, INTEL IRELAND COLLABORATION — In reactive ion etch processes radicals such as O play a major role in the process outcome due to their high reactivity. It is therefore of crucial importance that the precise oxygen density is measured for an improved understanding of plasma-induced processes. Reported on here is the determination of absolute atomic oxygen density within oxygen plasma using laser-induced fluorescence (LIF) as the diagnostics technique. The plasma investigated is a capacitively coupled RF discharge operating at 13.56MHz, Plasmalab System100. A two-photon absorption laser-induced fluorescence (TALIF) technique is used 2*225nm to avoid the challenging generation of high energy photons required for the single photon LIF 130nm. A calibration method is employed which enables the calculation of the O concentration without the need to know the spatial and intensity profile of the laser beam. However, it is also possible to infer radical concentration from a comparative measurement the intensities of selected spectral emission lines from OES data, this technique is called optical actinometry. The results of this project using the TALIF scheme will be used as a benchmark to validate the much simpler actinometry technique.

Samir Kechkar
Dublin City University

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