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Real-time monitoring of reactive species in downstream etch reactor by VUV broad-band absorption spectroscopy. R. SORIANO, L. VALLIER, G. CUNGE, N. SADEGHI, LTM, Univ. Grenoble CNRS — Plasma etching of nanometric size, high aspect-ratio structures is more challenging at each new technological node. Remote plasmas are beginning to find use when damages on nanostructures by ion bombardment become critical or when etching with high selectivity on different materials present on the wafer is necessary (*i.e.* tungsten oxide etching with fluorine and hydrogen containing plasmas in remote reactor from AMAT). Furthermore, it is expected that downstream plasma will replace many wet chemical etching processes to alleviate the issue of pattern collapses caused by capillary forces when nanometer size high aspect ratio structures are immersed in liquids. In these downstream plasmas, radicals are the main active species and a control of their density is of prime importance. Most of gases used and radicals produced in etching plasmas (HBr, BrCl, Br_2, NF_3, CH_2F_2,...) have strong absorption bands in the vacuum UV spectral region and we have shown that very low concentration of these species can be detected by VUV absorption [1]. We have recently improved the technique by using a VUV CCD camera, instead of the PMT, which render possible the Broad-Band absorption spectroscopy in the 120-200 nm range, with a deuterium lamp, or a laser produced xenon arc lamp as light source. The multi-spectral detection ability of the CCD reduces the acquisition time to less than 1 second and can permit the real time control of the process control. [1] G. Cunge *et al*, J. Phys. D : Appl. Phys. **44** (2011) 122001.

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