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QCLAS based in situ monitoring of low-k dielectric plasma etch processes NORBERT LANG, JÜRGEN RÖPCKE, HENRIK ZIMMERMANN, Leibniz Institute for Plasma Science and Technology, F.-Hausdorff-Str. 2, 17489 Greifswald, Germany, SVEN ZIMMERMANN, FRIEDER BLASCHTA, STEFAN E. SCHULZ, Fraunhofer ENAS, Technologie-Campus 3, 09126 Chemnitz, Germany, MATTHIAS SCHALLER, Globalfoundries Dresden Module Two GmbH & Co. KG, Wilschdorfer Landstr. 101, 01109 Dresden, Germany — The processing of modern interlevel dielectrics using reactive ion etching with molecular plasmas becomes more complex, in particular as far as further scaling of interconnect dimensions is concerned. To overcome problems like damaged structures in dense and porous etched low-k materials, powerful plasma diagnostics with in situ monitoring capabilities are needed. Recently, it has been shown, that quantum cascade laser absorption spectroscopy (QCLAS) has the ability for online and in situ monitoring of etch processes with high sensitivity and time resolution. This contribution describes the application of a quantum cascade laser measurement system (Q-MACS) to monitor the absolute concentration of important reaction products, like SiF_4, CO and COF_2 in CF_4 and CHF_3 etch plasmas. First results will be presented discussing the properties of etch processes of different materials depending on time depended species concentrations.

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