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Etching of photoresist with an atmospheric pressure plasma jet¹ ANDREW WEST, York Plasma Institute, University of York, UK, MARC VAN DER SCHANS, Eindhoven University of Technology, The Netherlands, CIGANG XU, Oxford Instruments Plasma Technology, UK, TIMO GANS, York Plasma Institute, University of York, UK, MIKE COOKE, Oxford Instruments Plasma Technology, UK, ERIK WAGENAARS, York Plasma Institute, University of York, UK — Low-pressure oxygen plasmas are commonly used in semiconductor industry for removing photoresist from the surface of processed wafers; a process known as plasma ashing or plasma stripping. The possible use of atmospheric-pressure plasmas instead of low-pressure ones for plasma ashing is attractive from the point of view of reduction in equipment costs and processing time. We present investigations of photoresist etching with an atmospheric-pressure plasma jet (APPJ) in helium gas with oxygen admixtures driven by radio-frequency power. In these experiments, the neutral, radical rich effluent of the APPJ is used for etching, avoiding direct contact between the active plasma and the sensitive wafer, while maintaining a high etch rate. Photoresist etch rates and etch quality are measured for a range of plasma operating parameters such as power input, driving frequency, flow rate and wafer temperature. Etch rates of up to 10 micron/min were achieved with modest input power (45 W) and gas flow rate (10 slm). Fourier Transform Infrared (FTIR) spectroscopy showed that the quality of the photoresist removal was comparable to traditional plasma ashing techniques.

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