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Glow discharge optical spectroscopy for sputter-depth profile analysis in plasmas PRIYANKA ARORA, University of Houston, JUNGHYUN CHO, Samsung Electronics, VINCENT DONNELLY, University of Houston — In-situ, real-time characterization of surfaces exposed to plasmas is of great interest. Chemical analysis methods are limited, however. Common chemical analysis methods, X-ray photoelectron spectroscopy and Auger electron spectroscopy, cannot be used because they require energy-resolved detection of electrons, as well as high-vacuum conditions. Consequently, another method for detection of sputtered species is needed. Here we discuss the use of optical emission spectroscopy for this purpose. In this study, a small coupon piece of aluminum coated with yttria, a common chamber wall coating in reactors used in plasma etching, was mounted on an rf-biased electrode and inserted into an opening in the reactor wall. Silicon or SiO₂ substrates on a separately rf-biased electrode were etched in an inductively-coupled plasma (ICP) of Cl₂/Ar or C₄F₈/O₂, respectively. Pulsed bias was applied to sputter the surface of the coupon piece in an Ar ICP. The difference in optical emission intensity between the coupon bias on and off condition was used to determine what species were present on the surface.

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