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Temperature Impact on Plasma-Surface Interactions in an FC Plasma Environment[1] CALEB NELSON, University of Texas at Dallas, IQBAL SARAF, LAWRENCE OVERZET, MATTHEW GOECKNER — Many variables influence the nature of plasma-surface interactions. These include: radical and ion fluxes, ion energy and angle distributions, surface temperatures, and surface materials. A simplified model relates radical and ion fluxes to process rates through sticking and etch yield probability coefficients, where such coefficients are functions of particle energy, surface temperature and impact angle. Here we make use of an easily adjustable plasma system, the modified GEC reference cell, to examine the influence of temperature on sticking coefficients and etch yields. The mGEC provides the option of changing chamber dimensions, wall material, and wall temperature. The variable electrode gap permits depositing radical fluxes to be controlled almost independently of ion and etching radical fluxes, allowing the deconvolution of the process rate model. The independent control of wall and chuck temperature can then be used to study the effect of surface temperature on plasma chemistry (changing wall recycling) and surface morphology, respectively. Increasing surface temperature decreases radical and ion-assisted deposition and alters the F/C ratio and process rate of the film as etch yields are increased.

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