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**Plasma-surface interactions<sup>1</sup>**

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Materials processing is at a crossroads. Currently much of industrially viable materials processing is via plasmas. However as this processing has reached the nano-scale, development of industrially viable processes has become more and more difficult. In part this is because of all of the free parameters that exist in plasmas. To overcome this economic issue, tool vendors and semiconductor companies have turned to complex computational models of processing plasmas. For those models to work, one requires a through understanding of all of the gas-phase and surface-phase processes that are exhibited in plasmas. Unfortunately, these processes are not well understood. In this paper we will examine a new model of plasma-surface processes. Specifically we will examine how the plasma-surface interactions set how process tools work. From this we will examine the potential future of the plasma-processing field.

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