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On the influence of surface quenching, electron emission and surface recombination on discharge properties

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In discharge modeling the various plasma surface interaction processes may have a significant influence on the discharge properties. These processes are commonly described by parameters that give the probability of occurrence of the process such as surface recombination to form molecules, surface quenching of metastable states and electron emission from surfaces due to ion, electron and neutral bombardment of surfaces. The surface interaction parameters, often describe a complex processes, that are not well understood, by a single number. These parameters have been measured for some processes, and usually over a limited parameter range, and commonly there are varying values for these parameters that have been measured. Some examples of measured values of such parameters will be discussed, including recombination and quenching probabilities on metal surfaces. The choice of these parameters can have a significant influence on the discharge, including particle densities, power absorption processes and discharge operation. Some examples of the influence of surface quenching of metastables, and surface recombination, on discharge properties and operating mode, and plasma parameters, in capacitively coupled, inductively coupled and magnetron sputtering discharges, will be given.