Atomic, Molecular, and Surface-Interaction Data Needs for ITER

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Abstract. Research related to the production of energy from the fusion of atomic nuclei has proceeded steadily for the last half century. One approach is to confine a high-temperature plasma with a magnetic field so that the thermal velocities of the particles are sufficient to overcome the Coulomb repulsion between ions. The "tokamak" has emerged as the preferred research configuration due to a strong performance scaling with size, and the ITER device under construction in France will be a definitive test for thermonuclear ("burning") plasma physics and reactor-scale engineering. During operation, fuelling, particle beam heating, the introduction of non-fuel elements into the plasma for energy dissipation, and interactions between the plasma and the inner wall of containment vessel can all contribute to atomic, molecular and surface-interaction (AMSI) processes. It is very important, therefore, to have a complete and high quality AMSI data set for use with simulation codes when designing in-vessel plasma-facing components, diagnostic systems, and operational scenarios. An ITER overview will be presented, followed by a discussion of data generation requests for all elements of interest (H, He, Be, C, N, Ne, Ar, Fe, W) for which the current data set is incomplete.