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Studies and comparison of currently utilized models for ablation in Electrothermal-chemical guns SHENLI JIA, RUI LI, XINGWEN LI — Wall ablation is a key process taking place in the capillary plasma generator in Electrothermal-Chemical (ETC) guns, whose characteristic directly decides the generator's performance. In the present article, this ablation process is theoretically studied. Currently widely used mathematical models designed to describe such process are analyzed and compared, including a recently developed kinetic model which takes into account the unsteady state in plasma-wall transition region by dividing it into two sub-layers, a Knudsen layer and a collision dominated non-equilibrium Hydrodynamic layer, a model based on Langmuir Law, as well as a simplified model widely used in arc-wall interaction process in circuit breakers, which assumes a proportional factor and an ablation enthalpy obtained empirically. Bulk plasma state and parameters are assumed to be consistent while analyzing and comparing each model, in order to take into consideration only the difference caused by model itself. Finally ablation rate is calculated in each method respectively and differences are discussed.

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