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High current density and low sputtering in cold cathode glow plasmas[1] SERGEY ZALUBOVSKY, SVETLANA SELEZNEVA, DAVID SMITH, DARRYL MICHAEL, TIMOTHY SOMMERER, GE Global Research — We investigate the use of cold cathodes in long-life high-voltage gas switches In such an application the current density should be high (to maximize the device current rating), the gas pressure should be low (to maximize standoff voltage on the left side of Paschen's curve), and cathode sputtering should be minimized (for long device life). We focus here on the rate of cathode sputtering as a function of both cathode materials and plasma conditions. The plasma is magnetized to increase the current density, and operates at an intermediate gas pressure, so we estimate the ion energy distribution at the cathode surface as a function of plasma parameters using both semi-analytic expressions and a particle-in-cell simulation.

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