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Effects of electrode coating on the CTIX injector performance during high-Z CT formation and acceleration[1] D. BUCHENAUER, Sandia National Laboratories, R.D. HORTON, R. EVANS, R. KLAUSER, University of California, Davis, B.E. MILLS, Sandia National Laboratories, D.Q. HWANG, University of California, Davis — One application of high velocity compact toroids (CTs) is the ability to deliver ions of various species to the magnetic axis of tokamak plasmas. The fast formation and acceleration of the CTs can react to rapidly changing events in a tokamak operation such as disruptions. As proposed in theoretical models, high-Z ions delivered to the magnetic axis of a reactor-grade tokamak have the benefit of cooling runaway electrons by the bremsstrahlung process and limiting the runaway electrons final energy and the potential damage to tokamak components. The Compact Toroid Injection Experiment (CTIX) is currently being used to demonstrate efficient production of high-Z CT plasmas using accretion of noble gases (He, Ne, Ar) puffed in the acceleration region. From previous observations of electrode damage due to repetitive operation of the CTIX injector with hydrogen CT's, it was decided to coat the inner electrode surfaces with vacuum-sprayed tungsten. The CT characteristics are measured using optical techniques, interferometry, and internal magnetic field probes. A detailed comparison of the CT behavior and parameters using the different electrodes, stainless steel and tungsten-coated Inconel, will be reported. In addition, analysis of the measured damage to the electrode surface will guide future improvements to the injector design that will yield the best high-Z CTs for the mitigation of runaway electrons.

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