The low-current cathode for a small power electric propulsion

P.M. Puchkov

SSC FSUE Keldysh Research Centre, Moscow, Russian Federation
p.m.puchkov@gmail.com

The cathode with low discharge current and low flow rate was designed and experimentally investigated. The general idea was to minimize a heat loss in the cathode body. The cathode had a classic configuration featuring impregnated with a mixture of $BaO\text{-}CaO\text{-}Al_2O_3$ porous tungsten emitter with low-work function. The emitter assembly was surrounded by the starting heater which had no direct contact with the first one. Heat was transferred from the heater to the emitter assembly by radiation. The keeper disposed around the heater protected the internal components of cathode from external plasma influence.

The cathode was tested with discharge currents from the range of 0.09 – 0.30 A. Xenon flow rate was varied from 0.016 to 0.080 mg/s. The keeper discharge was used to maintain the thermal regime of the emitter during the operation of the cathode. The power of the keeper discharge was on the level of 10 W during the test.