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Characteristics of Cold Hollow Cathode Ion-Beam source for Oxygen gas

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A cold hollow cathode type ion source was characterized using oxygen gas by the variations of ion-beam-potential, discharge voltage and oxygen flow rate. This broad ion source consisted of two 5-cm flat screen and acceleration grid. In comparison with the conventional Kaufman type ion source, it has great merit to use the various reactive gases. To investigate the ion beam quality, the distribution of ion-beam-current density was measured at various conditions. The working pressure in this experiment was kept around 1.5×10^{-4} Torr. A Faraday cup movable to a maximum angle of 45° from the beam center was placed at a height of 45 cm from the ion beam source. When O_2 gas was introduced into the discharge chamber at a flow rate of 2 sccm, the maximum of ion beam current density was $22 \mu A/cm^2$ and the uniformity with 90 % higher was observed within the ejection angle of 25° .