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The use of Hollow Cathodes in deposition processes: a critical review

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The first report of a discharge in a hollow cathode was by F. Paschen in 1916. That study showed that such a system was capable of producing a high electron flux and relatively low ion and neutral temperatures. About 40 years later, the work of Lidsky and others showed that hollow cathode arc discharges were one of the best plasmas sources available at that time. The term “hollow cathode discharges” has commonly been used in reference to almost any discharge in a cathode with a cavity-like geometry, such that the plasma was enclosed or partially bound by the electrode walls that were at the cathode potential. Just as the magnetic field trapping of the electrons in a magnetron cathode results in an increase in the plasma density, in the hollow cathode, the reduced electron loss due to the geometry of the cathode also results in a higher plasma density. At least three types of discharge can be established in a hollow cathode. At low power and/or at relatively low gas pressures, the plasma is a “conventional” discharge characterized by low currents and medium to high voltages (we will call this a discharge in a hollow cathode or D-HC). Even this type of plasma has a higher

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