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DC driven low pressure glow discharge in high water vapor content: A characterization study.[1] MALIK TAHIYAT, TANVIR FAROUK, Univ of South Carolina — Plasma discharge in liquid medium has been a topic of immense interest. Theoretical efforts have been pursued to get insight on physicochemical processes being influenced due to trace water vapor either present as residual or provided at known concentration. However, studies on discharge at high vapor content is limited. In this study discharge characteristics of plasma in high water concentration (>90%) is investigated experimentally for pressure range of 1–15 Torr to maximize vapor loading without condensation. Voltage-current characteristics was obtained over 0-14 mA of current for each operating pressure; current density was determined to ensure normal glow regime of operation. Spatially resolved optical emission spectroscopy was also conducted to determine OH, O, H_2 and H distribution in the interelectrode separation. The normalized intensities of OH and O emission lines are found to be more prominent in positive column, whereas the emission lines of H are most intense in cathode glow region. The electric field distribution along the discharge gap was also measured. We envision that data obtained from this characterization study will also provide valuable data for validation of plasma kinetic schemes associated with water vapor.

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Malik Tahiyat
Univ of South Carolina

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