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Kinetic Model for Water Vapour Plasma of the UV Discharge Lamp SVETLANA AVTAEVA, Kyrgyz-Russian Slavic University, ANDRIY GENERAL, 2Institute of Electron Physics of NAS Ukraine — The discharge lamp on water vapour (WV) is an effective source of the OH^* hydroxyl emission in the VUV and UV spectral range. The lamp represents a gas discharge tube from fused silica with inner diameter of 12 mm and gap length between electrodes disposed on the exterior tube surface of 20 cm. Pressure of WV was 150Pa. Pulse voltage 2-4 kV with frequency 2 - 10 kHz was applied to electrodes. In the emission spectrum intensive molecular bands of the OH^* hydroxyl and atomic hydrogen lines are observed. The kinetic model based on solution of the kinetic equations for plasma species and an equation of the electron energy balance was used to calculate time dependencies of densities of WV plasma species. The calculations have shown that $E/N \sim$ 190-200 Td is critical for WV plasma, with increase in E/N there is a transition from electronegative to electropositive plasma. Electronegative plasma can be maintained only at presence of the preliminary ionization. Basic positive ions in WV plasma are H_3O^+ ions, basic negatively ions are OH^- ions. Kinetic curves of the primary and secondary products of the plasma-chemical reactions differ, the secondary products, H_3O^+ excepted, occur later in a time and their densities are below in comparison with densities of the primary products.

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