Abstract Submitted
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Properties of low-pressure rf capacitive discharge in acetylene V.A. LISOVSKIY, S.V. DUDIN, P.P. PLATONOV, S.I. BOGATYRENKO, A.A. MINENKOV, V.N. Karazin Kharkiv National University — We measured breakdown and extinction curves of radio-frequency discharge in acetylene as well as dependences of active current, power and gas pressure on the discharge burning time, and also optical emission spectra. The experiments were carried out in the range of acetylene pressure of 0.02 - 10 Torr at a distance between the electrodes of 20 mm. It was found that in the region of low acetylene pressures (to the left of the minimum of the breakdown curve), the discharge can cover only a part of the electrode surface. Immediately after the ignition of the discharge, due to the intense deposition of the polymer film and the formation of dust particles in the plasma volume, the gas pressure decreases sharply (by the factor of 2–5), while the active current and power increase and then reach saturation. In the discharge with intense polymerization, the lines of atomic and molecular hydrogen dominate in the emission spectrum of the discharge. The film deposited on the surface of the electrodes and the tube walls, as well as the dust particles formed, are amorphous, the maximum peak of XRD spectrum is observed at $2\theta = 18$, and the light absorption by the deposited films is highest at 440 nm wavelength.

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