

Abstract Submitted
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Electroluminescence spectra and structure of aluminum oxide during its formation in protium and deuterium water¹ DMITRY OVECHENKO², ALEXANDER BOYCHENKO³, Kuban State University — Electroluminescence (EL) spectra were recorded for the first time and the possibility of electrolysis of the formation of the nanoporous structure of aluminum oxide (Al₂O₃) in chemically pure water with different contents of protium (H) and deuterium (D) isotopes was shown. The similarity of the Al₂O₃ structure during its formation in aqueous solutions of electrolytes was revealed. It was found that under constant anodizing conditions (temperature 298 K, voltage 1.2 kV and anodizing time 1700 s), the structure of formed Al₂O₃ differs significantly for protium water (H₂O 99.99%) and deuterium water (D₂O 99.90%) . In the first electrolyte, the oxide has a spongy structure with an average pore diameter of 600 nm, and in the second, their average diameter does not exceed 100 nm. The maxima of the spectra of the EL generated during this process are in the short-wavelength region of the visible range and, accordingly, are 455.2 nm for Al₂O₃ in H₂O and 445.9 nm in D₂O, which suggests a shift of the maxima by 9.3 nm. In the long-wavelength region (range 611 - 613 nm), this shift is smaller and amounts to 1.6 nm. It was found that the EL brightness of formed Al₂O₃ in H₂O is 1.6 times higher than in D₂O.

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