Emission properties and back-bombardment for CeB6 compared to LaB6

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Abstract:

The emission properties of CeB6 compared to LaB6 thermionic cathodes have been measured using an electrostatic DC gun. Obtaining knowledge of the emission properties is the first step in understanding the back-bombardment effect that limits wide usage of thermionic radio-frequency electron guns. The effect of back-bombardment electrons on CeB6 compared to LaB6 was studied using a numerical simulation model. The results show that for 6 ls pulse duration with input radio-frequency power of 8 MW, CeB6 should experience 14% lower temperature increase and 21% lower current density rise compared to LaB6. We conclude that CeB6 has the potential to become the future replacement for LaB6 thermionic cathodes in radio-frequency electron guns

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