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Second generation of multi-alkali antimonide photocathodes for high-gradient RF guns

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Due to their excellent photoemissive properties, especially low thermal emittance and high sensitivity in the green wavelength, multi-alkali antimonide photocathode, particularly potassium-cesium-antimonide, have emerged as prominent photoemissive materials for the electron sources of high-repetition-rate FEL applications. To explore their feasibility of operating in a high-gradient RF gun, DESY collaborated with INFN LASA to develop multi-alkali photocathode materials. Three KCsSb photocathodes and one NaKSb(Cs) cathode were grown on molybdenum substrates using the sequential deposition method in the new preparation system at INFN LASA. Subsequently, these cathodes were transferred successfully to PITZ for testing in the high-gradient RF gun. This contribution summarizes the growth procedures and experimental results obtained from these second-generation multi-alkali antimonide cathodes.

Footnotes

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