FABRICATION AND RECESIATION OF ALKALI ANTIMONIDE PHOTOCATHODES

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Abstract

High performance FELs require photocathodes with quantum efficiencies of several percent at green wavelengths, kHr lifetime, kA/cm^2 peak and A/cm^2 average current, and ps response. Such cathodes are challenged to maintain requisite high quantum efficiency while in harsh accelerator vacuum conditions. Delicate surface coatings are often cesium-based, and therefore are reactive with contaminant gases. The dispenser photocathode architecture resupplies the cesium coating from a subsurface reservoir through a porous substrate, thereby extending lifetime*. Recesiation has been shown to rejuvenate Cs:Ag cathodes from O_2, CO_2, and N_2O contamination**, and theory of dispenser photocathodes is advancing***. We here investigate the fabrication, contamination, and external recesiation of alkali antimonides with high quantum efficiency, in support of the dispenser photocathode design.

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