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Experimental study on deposition of Nb3Sn thin films on 6 GHz copper half-cell using Co-sputtering

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As the application of superconducting cavities becomes increasingly widespread, the development of cost-effective coatings with enhanced performance has become a focal point for researchers. This study primarily focuses on depositing niobium-niobium-tin (Nb3Sn) multilayer thin films on the inner surface of a 6 GHz copper half-cell via the co-sputtering method. The emphasis is on preparing coated superconducting cavities with excellent surface morphology, high quality factor (Q), and high accelerating gradient (Eacc). The copper half-cell is split along its axis, and superior superconducting films are prepared by controlling various co-sputtering conditions, followed by electron beam welding to reassemble the cavity. To date, through sample experiments, we have successfully prepared copper samples coated with Nb3Sn that exhibit a dense surface and a critical temperature (Tc) as high as 17.2 K.

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Yes

Footnotes

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