

THE INVESTIGATION OF SPUTTERED S(I)S STRUCTURES FOR SRF CAVITIES

A.Ö. Sezgin¹, C. Z. Antoine⁶, X. Jiang¹, S. Keckert³, J. Knobloch^{3,5}, O. Kugeler³, O. B. Malyshev⁵, R. Ries², E. Seiler², L. Smith⁵, D. Tikhonov³, M. Vogel¹

¹Institute of Materials Engineering, University of Siegen, Siegen, Germany

²Institute of Electrical Engineering SAS, Bratislava, Slovakia

³Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany

⁴Department of Physics, University of Siegen, Siegen, Germany

⁵ASTeC, STFC Daresbury Laboratory, Warrington, United Kingdom

⁶CEA Irfu, Centre d'Etudes de Saclay, Gif-sur Yvette Cedex, France

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The proposed thin film-based multilayer structures in the form of superconductor-insulator-superconductor (SIS) may be the long-sought-after breakthrough for higher performance SRF cavities by enhancing both accelerating gradients and quality factors. In order to understand better the underlying mechanisms of SIS structures to be coated onto (S)RF cavities, we study sputtered S(I)S structures of Nb-(AlN)-NbN with different thicknesses which are designed to be coated mainly on OFHC copper (Cu) samples for more efficient SRF cavities. In this presentation, the results from both DC and AC magnetization characterizations of the aforementioned multilayer structures are going to be discussed along with their material characteristics in order to assess better the observed phenomena such as non-monotonic surface resistance (R_s) behavior of some SIS structures as well as the recently shown outperformance of the SS structure with respect to the SIS structure of the aforementioned thin films in terms of higher RF penetration field and lower R_s values, albeit having lower critical temperature (T_c).

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