

thinfilms and NEW IDEAS for SRF

Contribution ID: 24

Type: not specified

X-ray Computed Tomographic Investigation of the defect on Niobium coated copper radio frequency cavity

Wednesday, 10 October 2018 11:35 (25 minutes)

S. Aliasghari^{1,2}, P. Skeldon², A. Gholinia², R. Valizadeh¹,

¹ ASTeC, STFC Daresbury Laboratory, Daresbury, Warrington, Cheshire WA4 4AD, UK.

² Corrosion and Protection Group, School of Materials, The University of Manchester, Manchester M13 9PL, UK.

Defects on the niobium superconducting radio frequency (SRF) can have an important impact on quality factor at low accelerating fields. However, the quantification of the defects can be difficult due to shape of cavity. In this work cracks formed on niobium at copper substrate is examined using high resolution X-ray computed tomography (X-ray CT). The observations are validated by comparisons of cross-sectional views of features obtained using focus ion beam (FIB) scanning electron microscopy and X-ray CT. The X-ray CT technique is shown to be capable on a correlation between the locations of the defects on niobium thin film surface, and in the copper substrate. Furthermore, the volumes of defect are revealed on niobium surface. The locations and EDS analysis of the crack indicate that they are probably generated by impurities during BCP and EP of copper or dissolved hydrogen, the cool down rate, and interstitial impurities serving as nucleation centres for forming hydrides on niobium coating.

Primary author: Dr ALIASGHARI, sepideh (research fellow)

Presenter: Dr ALIASGHARI, sepideh (research fellow)

Session Classification: Material characterization for SRF films

Track Classification: RF and material characterization for SRF films