Contribution ID: **403** Type: **Poster Presentation**

Progress on fabricating seamless RRR Nb tubes for SRF applications

Tuesday 30 June 2015 09:00 (2 hours)

The objective of the work reported is to demonstrate a fabrication method for developing reproducible uniform fine-grained microstructures in seamless RRR Nb tube. The target application is the inexpensive manufacture of RRR Nb superconducting radio frequency (SRF) cavities. Present methods to manufacture seamless Nb tubing from rolled Nb sheet by deep drawing, spinning, and flow forming indicate inconsitencies in microstructure along the through thickness of the tube. To tackle these problems and obtain seamless tubes that hydroform well, we have been developing a severe plastic deformation (SPD) process in combination with traditional tube extrusion by forward and backward extrusion. Forward extruded tubes in combination with SPD have indicated tremendous promise with similar mechanical characteristics, hardening exponents of 0.2 along the major tube axes, and ductilities greater than 40%. In order to increase process yield, a multi-step fabrication process involving an initial back extrusion and subsequent forward extrusion has been developed. Preliminary results on the effect of process path changes will be presented. Microstructure variations in terms of grain size, grain size distribution, and formation of novel textures along the tube circumference will be compared to previously fabricated Nb tubes by forward extrusion. Measurements of concentricity and thickness variations of the seamless Nb tubing will also be reported.

Author: BALACHANDRAN, Shreyas (Texas A&M University)

Co-authors: FOLEY, David (Shear Form Inc.); HARTWIG, Karl (Texas A&M Univefrsity); BARBER, Robert (Shear Form Inc)

Presenter: BALACHANDRAN, Shreyas (Texas A&M University)

Session Classification: C2PoD - Superconducting RF Systems II

Track Classification: ICMC-11 - Metallic and Composite Materials