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Conductance Degradation in HTS Coated Conductor Solder Joints

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Solder joints between YBCO coated conductors and normal metal traces have been analyzed as part of an effort to develop a robust HTS lead assembly for a spaceflight mission. Measurements included critical current and current transfer profiles. X-ray micrographs were used to verify proper solder flow and to determine the extent of voiding. SEM of cross-sections with XDS analysis were crucial in understanding the diffusion of the protective silver layer over the YBCO into the solder for different solder processes. The assembly must be stored for an extended period of time prior to final cool-down and operation. Measurements of joint resistance over the course of months show a significant increase with time. Understanding the interface condition suggests an explanation for the change.

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