Contribution ID: **418** Type: **Poster**

M1Po2B-03: Smooth wafer-scale superconducting MgB2 films with high kinetic inductance for high frequency superconducting devices

Monday 10 July 2023 14:00 (2 hours)

The advance in superconducting microdevice technologies over the past couple of decades has shown promise for practical applications of quantum computers and superconducting photon detectors for far-IR telescopes and optical communications. One of the key factors limiting the current technology lies in the small gap and limited kinetic inductance of superconducting materials being used. Magnesium diboride (MgB2) has the largest known gap –well above 1 THz –among metallic superconductors in ambient pressure, but has not been utilized due to the lack of wafer-scale films suitable for microdevice fabrication. Here we present high quality smooth MgB2 films on 4-inch Si wafers with high uniformity, roughness below 0.5 nm rms, and high kinetic inductance of 46 pH/sq. We have further developed mature fabrication processes for a large-area array of devices, and present results of these processes along with proof-of-concept prototypes.

Author: KIM, Changsub (Jet Propulsion Laboratory)

Co-authors: Dr CUNNANE, Daniel (Jet Propulsion Laboratory); GREENFIELD, Jonathan (Arizona State University)

Presenter: GREENFIELD, Jonathan (Arizona State University)

Session Classification: M1Po2B: HTS Bulk, Fe-based, and Thin Films