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M3Or1B-03 [Invited]: REBCO Tapes on Flexible Dielectric Substrates as Transmission Lines for High Frequency Applications

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There is a strong interest in superconducting transmission lines that operate at microwave frequencies between milli-Kelvin and temperatures near 100 K. We are developing high-quality thin film REBCO superconductor microwave transmission lines on flexible dielectric substrates with thermal conductivity, microwave loss factor and surface resistance that meet application requirements. The high quality REBCO films are grown by an advanced metal organic chemical vapor deposition (A-MOCVD) process on flexible yttria-stabilized zirconia (YSZ) substrates. Intermediate buffer layers based on ion beam assisted deposition (IBAD) MgO are used for a high crystalline quality. The Q-Factor of the REBCO tapes at 77 K is found to be comparable with that of films grown on expensive single crystal wafer substrates. The critical current, microwave properties, surface resistance and bend characteristics of the REBCO tapes on flexible YSZ substrates will be reported in this presentation.

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