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Evaluation of low-loss alumina material for high-power RF windows

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Conventional RF vacuum windows are made of metalized ceramics, hermetically brazed to a pillbox cavity. High-power windows, operating in UHF band, require the fabrication of ceramic disks with diameters on the order of 200mm (8"). Furthermore, a Titanium Nitride (TiN) multipactor suppression coating must be applied to the ceramic surfaces. The large size and complex internal geometry of these windows create challenges in validating the coating in the fully fabricated assembly. This study evaluates a novel low-loss alumina AO479U, provided by Kyocera, and a reactive sputtering process suitable to deposit a 10-20nm thick TiN coating on a large diameter window. The paper will report the changes in the TiN coating through chemical cleaning and vacuum braze processes using contact profilometry, optical microscopy, Scanning Electron Microscopy (SEM), and Rutherford Backscattering Spectroscopy (RBS).

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Footnotes

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