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Low RF loss DC conductive ceramic for RF windows

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Charging of RF windows has historically been problematic, frequently resulting in damage to the window severe enough that the window needs to be replaced. Many attempts have been made to prevent charging and therefore improve window lifetime, the most successful and common of which is coating the window with titanium nitride (TiN). Surface coatings such as TiN rely on the secondary electron yield of the coating material being lower than that of the ceramic window material, reducing the number of electrons emitted from a variety of mechanisms. An alternative approach is to introduce a small amount of DC conductivity to the ceramic itself, turning the traditionally insulating window into a mildly conductive one. This allows any charge on the surface of the window to drain rather than build until a discharge happens. A magnesium titanate ceramic has been developed with a small DC conductivity and used to make RF windows. Several window assemblies have been produced and tested, including 1.3 GHz waveguide and 650 MHz coaxial designs. The results of the conductive ceramic window test program will be presented.

Footnotes

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