IAF SPACE POWER SYMPOSIUM (C3)
Space Power System for Ambitious Missions (4)

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VANADIUM OXIDE FOR HIGH TEMPERATURE SUPER CONDUCTION FOR INTERPLANETARY MISSIONS

Abstract

In recent space exploration missions we have eyes on planets such as Mercury, Mars and missions like parker probe for landing our future spacecrafts. On landing on such planets we have soaring temperature of 430 degree Celsius or more where normal electronic components will not sustain in such harsh condition and will require extra power for working, in such conditions we can use Vanadium oxide as the material for electronics. Vanadium oxide can be called as High temperature superconductor where this material tends to act as superconductor above the temperature of 100 degree Celsius so when we have that the various electronic component can be made out of doping the material with the vanadium oxide we can have the following components to tend superconducting behavior and hence we can cut of the following supply to the electronic board and we can save power for any other activity that can be performed by the spacecraft. The following critical temperature after which the material starts acting as a superconductor can be changed by doping the vanadium with the titanium for further increment or the decrement of temperature electronic according to the required surrounding temperature. Even on direct contact to following environment wont cause a lot of difference on performance of vanadium oxide based components where a silicon wafer board can easily be affected and hence we have that the quantum tunneling can take place resulting in damaging the board components and output of sensors/actuators which are to be guided for the mission. Life time for following boards can be increased and thus we have longer mission timing can be achieved. The use of vanadium oxide for following wafer selection also results in that it is the only material which tends to have super conduction at such temperature which results it in getting used in any mission which are to be on planets tending for higher temperature environment, also the vanadium oxide can tuned for ultra sensitive radio frequency filters for communication model and low power electronics, also it can be further used for the following moon missions . To conclude, we have that vanadium oxide can be used for future missions of landing on planets with higher temperature environment and can be working in a lower power requirement with almost more lifetime than any other selected material for the electronic system.