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LOW TEMPERATURE CO-FIRED CERAMICS TECHNOLOGIES FOR COMMUNICATION SATELLITES APPLICATION

Abstract

This paper introduces the development of low temperature co-fired ceramics (LTCC) technologies for communication satellites. The evolution of the LTCC technology is presented. Low microwave losses, possibility of hybrid integration, modular design, and hermetic packaging have been known for its properties. It has a number of advantages compared with polymers or silicon. LTCC enables compact RF modules with high density multi-layered structures and embedded passive or integrated circuits. LTCC stands for a 3-dimension ceramic substrate system that is applicable in microwave and millimeter waves circuits or modules design as competitive substrate technology with multi-layers structure. As the advantages of LTCC, it has been adopted for communication payload design. Several examples including passive and hybrid integrated devices are demonstrated in this paper, such as low pass filter, power distribution and network, antenna module, switch matrix and synthesizer module etc.. And these devices have being verified on orbit. For the space environment, the challenges and issues of LTCC for the satellites application are suggested. Finally, the future of LTCC technologies evolution for space application is mainly presented.