

Abstract Submitted
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A Low Temperature Co-fired Ceramics Manufactured Power Inductor Based on A Ternary Hybrid Material System YUNSONG XIE, Argonne national lab, RU CHEN, University of Delaware — Low temperature co-fired ceramics (LTCC) is one of the most important techniques to produce circuits with high working frequency, multi-functionality and high integration. We have developed a methodology to enable a ternary hybrid material system being implemented into the LTCC manufacturing process. The co-firing sintering process can be divided into a densification and cooling process. In this method, a successful ternary hybrid material densification process is achieved by tuning the sintering profile of each material to match each other. The system integrity is maintained in the cooling process is obtained by develop a strong bonding at the interfaces of each materials. As a demonstration, we have construct a power inductor device made of the ternary material system including Ag, NiCuZn ferrite and non-magnetic ceramic. The power inductors well maintains its physical integrity after sintering. The microscopic images show no obvious sign of cracks or structural deformation. More importantly, despite the bonding between the ferrite and ceramic is enhanced by non-magnetic element diffusion, the undesired magnetic elements diffusion is effectively suppressed. The electric performance shows that the power handling capability is comparable to the current state of art device.

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