Ceramic/Polymer Microwave Composites via the Cold Sintering Process

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As a newly emerged sintering methodology to achieve dense ceramics/composites at extraordinarily low temperatures (room temperature to ~200°C), the Cold Sintering Process (CSP) has already been shown to have great potential. In this work, dielectric Li₂MoO₄ (LMO) ceramics and $(1-x)Li_2MoO_4-xPTFE$ (LMO-xPTFE, 0 < x < 1) ceramic-polymer composites with high densities and good microwave dielectric properties were obtained by CSP at 120~200°C. The coexistence of LMO and PTFE was confirmed by X-ray diffraction and scanning electron microscopy, with no other phases present. Furthermore, the permittivity of the cold sintered LMO-xPTFE composites was found to decrease with increasing the volume fraction of PTFE accompanied by high *Qf* values. Our work thus confirmed that CSP has great potential for the development of dense ceramics/composites for *rf* applications.