

Processing and Optimization of Ferroelectric 95/5 PZT Ceramics

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The current work demonstrates development of a process for the synthesis of Nb-doped 95/5 PZT powders and explores process optimization of ferroelectric ceramic components. The effects of powder calcination, blending, pressing, tape casting and firing were explored, and their relationships with structure, chemistry, and properties are discussed. Dielectric, ferroelectric, and piezoelectric properties of ceramics as a function of processing conditions are established, and finally they are compared to state-of-the-art properties listed both in literature and as-measured from parts received by Sandia National Labs. Through this work, an approach to fabricating 95/5 PZT ceramic components as a proof-of concept is developed which appropriately sets the stage for discussing the feasibility and challenges to manufacturability of larger ceramic form factors.

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