

**PIEZOELECTRIC PROPERTIES AND ISOLATION RESISTANCE OF
Pb(Zr,Ti)O₃ WITH PbO-WO₃ ADDITIVE**

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The objective of this work was to investigate the influence of PbO-WO₃ additive on the piezoelectric properties and isolation resistance of lead zirconate-titanate (PZT) near the morphotropic phase boundary. The addition of PbO-WO₃ successfully reduces the sintering temperature of PZT [1] by the formation of a liquid phase due to a eutectic at 730 °C. For high performance piezoelectric ceramics used in multilayer-actuator applications, the influence of the addition of WO₃ on the piezoelectric properties as well as on the isolation resistance of the ceramic is of great interest. Multilayer actuators operate under high field conditions (> 2 kV/mm) and any decrease in piezoelectric constants and/or isolation resistance will be detrimental to performance and life-time. Ceramic powders were prepared by the mixed-oxide method. PbO-WO₃ was added either before or after calcination. Densification was monitored by dilatometry. Piezoelectric properties were measured on sintered disc samples under high field conditions. Impedance spectroscopy was used to investigate the isolation resistance of the ceramics at different temperatures.

[1] Nielsen, E. R., Ringgaard, E., Kosec, M., "Liquid-phase sintering of Pb(Zr,Ti)O₃ using PbO-WO₃ additive" J Europ Ceram Soc 22 (2002) 1847-55.