AC poling of PMN-PT single crystals used for medical ultrasonic transducers

Die Lin, Jie Jiao, Jialin Xu, Zhuang Zhuang, Jianwei Chen, Haosu Luo*
Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

AC poling is used to enhance the piezoelectric performance of PMN-PT single crystals, which could be up to 4900pC/N. The piezoelectric performances have been investigated with their hierarchical structure and phase transition after the AC poling process of PMNT single crystals, which demonstrated that high piezoelectric performance is caused by increased domain wall density and induced monoclinic phase in PMNT single crystals.
The AC poling process will be benefit to fabricate the medical ultrasonic transducer, and enhance the performances of ultrasonic transducers significantly. Our results show the high performances of PMN-PT transducers were fabricated, 90% bandwidth at -6dB insert loss for the phased array probe, compared with 78% bandwidth for PZT probe, and 100% bandwidth at -6dB insert loss for the curved array probe, compared with 70% bandwidth for PZT probe.

References

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