Characterisation and properties of fine-scale PZT fibres

A. Dent *[a], L. Nelson [a], C. Bowen [a], R. Stevens [a], M. Cain [b], M. Stewart [b]

[a] *Materials Research Centre, Department of Engineering & Applied Science, University of Bath, UK*
[b] *Materials Centre, National Physical Laboratory, Teddington, Middlesex, UK*

* Corresponding author. Tel.: +44-1225-383062; fax: +44-1225-386098.
E-mail address: ea2aced@bath.ac.uk (A. Dent).

Abstract

The availability of fine scale PZT fibres has enabled advances in sensor and actuator applications, including devices for structural control such as the Active Fibre Composite (AFC). Since PZT fibres form active elements within a functional device, fibre characterisation and optimisation is essential. Several commercially available fibres have been studied, which are representative of the two dominant processing routes currently utilised: extrusion and suspension spinning. Fibres have been characterised in terms of morphology (shape factor and diameter variability), microstructure (grain size and porosity,) and phase composition (XRD). Certain fibres were found to exhibit properties unsuitable for AFC applications, which suggests that commercial production of fine scale PZT fibres may not yet be fully optimised.