



METCO: Metrology of Electrothermal Coupling for New Functional Materials Technology

Project Overview

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National Physical Laboratory

Stakeholder meeting, 27th November 2012

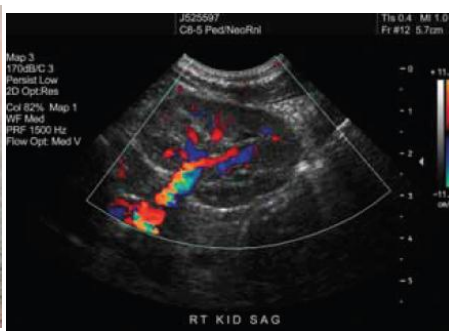
High Temperature Piezoelectrics



Power and process industries
ultrasonic NDE (nondestructive
evaluation) up to 750 °C



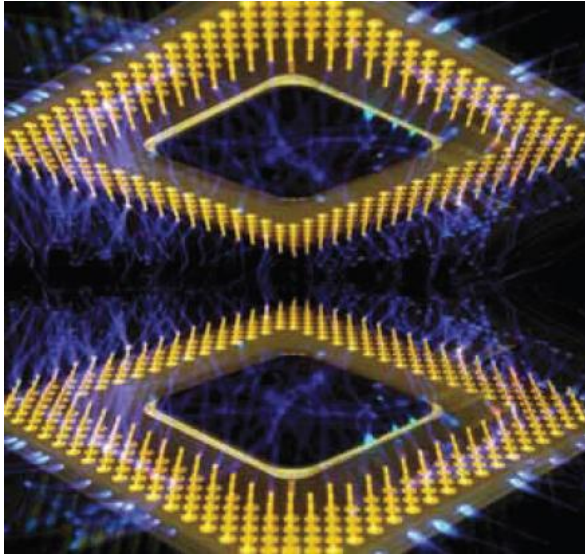
Valves and transducers for cars and
aero-engines need to operate reliably
at temperatures in excess of 500 °C



Ultrasonic surveying transducers need
to operate above 210 °C

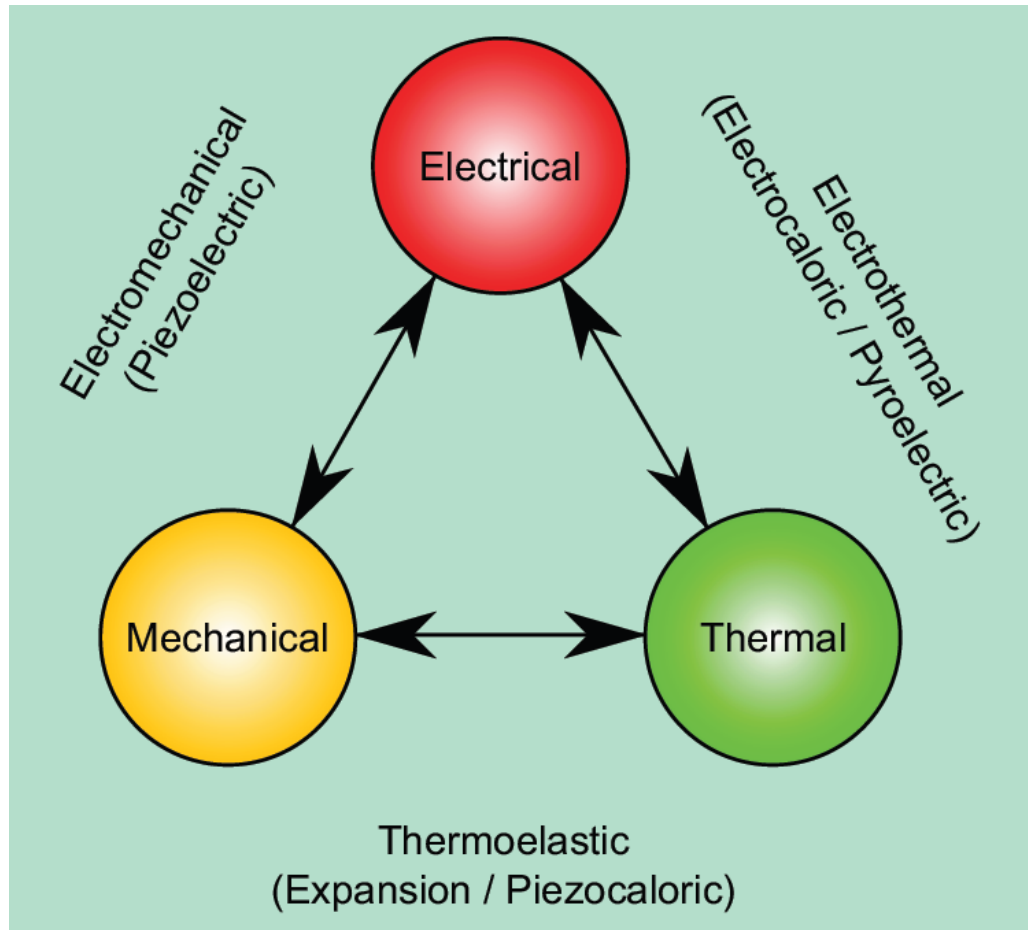
Medical ultrasound transducers cannot
be autoclave sterilised (135 °C)

Electrocaloric Refrigeration



High efficiency solid state cooling would enable faster electronics and more efficient refrigeration

Challenges



Reliable, accurate and traceable measurement of electro-thermo-mechanical coupling at high temperatures

Consortium



METCO Work Packages

WP1: Traceable Measurement of Piezoelectric and Thermal Expansion to 1000 °C. Interferometry and resonance measurements

WP2: Electrocaloric Coupling: Novel facilities for the traceable measurement of electrothermal coupling and electrocaloric figure of merit in bulk and thin films under high electric fields at temperatures up to 250 °C

WP3: Absolute Length – High accuracy piezoelectric and thermal expansion measurement up to 200 °C

METCO Work Packages

WP 4: Traceable measurement of high temperatures and thermophysical properties under electric field

WP 5: Modelling of Thermo-Electro-Mechanical Coupling. Develop new models of the metrological linkages between thermo-electro-mechanical coupling in materials and the measurement protocols developed in WP1-WP4 and performance in devices.

WP 6: Materials for metrology: Provide state of the art new materials technologies and apply the metrology developed in this project to the development of new high temperature materials.

WP 7: Creating Impact. Information exchange with our collaborators, training, workshops, web-based dissemination and publications.

- Stakeholder Meetings (2 including this one)
- Quarterly Webinars
- Website and Blog
- Publications and conferences

WP 8: Management

For further information

METCO

metrology of electro-thermal coupling



About Metco

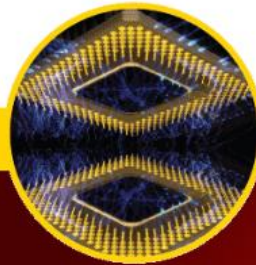
Work Packages


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[Download the METCO Flyer](#) 

High temperature piezoelectric materials for automotive, energy, process, electronics and medical industries

New technologies are being developed that will enable reductions in energy consumption and improvements in efficiency and reliability in

New materials - new metrology

Reliable measurement is essential to provide the data required for the development of new materials technology, effective design of new devices, reliability in characterisation and test, and to ensure quality in manufacture and reliability in service. METCO will develop

<http://projects.npl.co.uk/METCO/>

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