"Application of a piezo sensor matrix for in situ, real-time characterization of low energy nuclear events."

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An experimental design is presented which includes a high-throughput technique for identifying environmental conditions and material surface morphologies responsible for Low Energy Nuclear Reaction (LENR) active sites." LENR active sites occur at discreet morphologies on the surface of a substrate, becoming activated, releasing heat and then self-destructing in a high energy event.

A simple piezo sensor matrix is applied in intimate contact with the LENR active substrate to identify the location of active sites as well as monitor their characteristics over time. Location and quantification of active sites and active site events is achieved by calibrating and characterizing sound and heat wave propagation values in the system. De-convolution algorithms based on wave propagation and triangulation can accurately determine point sources of heat and sound waves, allowing for monitoring of active sites in real-time. Pre-experiment analysis with SEM can identify the morphology responsible for active site creation while post-experiment analysis with SEM and XRF can confirm the presence of active sites and craters or transmutation products.

This low cost, real-time system can be used in tandem with SEM/XRF to rapidly screen material samples for the production of anomalous heat and active site events. Due to the real-time nature of the technique, environmental variables and triggering mechanisms can be rapidly investigated to determine optimal conditions for activation and control of LENR active site events.