



Editorial

In recent years the term *Smart Materials* has received increasing attention. The term *smart* suggests emulation of living systems which sense their environment, evaluate these inputs in relation to knowledge stored in memory and respond accordingly, thereby operating with a built-in *feedback* mechanism. From a technological standpoint, the feedback system's functions are commonly subdivided into the categories of 1) sensor, 2) microprocessor and memory and 3) actuator. Since the *brain* of the feedback network operates nearly exclusively in the electrical domain, the sensor must function as a transducer converting various physical and chemical inputs or stimuli into electrical outputs, while the actuators convert electrical inputs from the microprocessor into the appropriate physical and chemical outputs. Traditionally, ceramics have been admired for their mechanical, chemical and thermal stability. As *electroceramics*, we also know them to exhibit a range a characteristics ideally suited for transduction purposes, viz. piezoelectric, pyroelectric, electro-optic, thermoelectric, electrochemical, etc.

Feedback systems, presently of most technological interest, are those that satisfy the need for high speed, small size, low power drain, harsh environment operation and reasonable cost. It is the combination of the traditional ruggedness of conventional ceramics with the exceptional functionality of select electroceramic materials that make electroceramics particularly attractive as *smart materials* and as components of *smart systems*. To satisfy requirements for miniaturization, the challenge remains how to effectively integrate electroceramic materials into silicon microelectronic and microelectromechanical (MEMS) technologies. Progress along these lines has been stimulated by the integration of ferroelectric thin films with silicon MOSFET technology for non-volatile memory devices. Lessons learned need now be applied to the development of smart systems. We plan to bring special issues of the *Journal of Electroceramics* and/or feature articles on smart materials to our readers in the coming year. I encourage our leaders, as well, to submit their own work to our journal in this rapidly growing field.

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