

SMART MATERIALS: THE NEW ERA AND THE FUTURE

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Abstract

This paper presents a brief and simple overview of the smart materials technology. The advancement in technology towards 'smart' systems with adaptive and/or intelligent functions and features necessitates the increased use of integrated sensors, actuators and micro-controllers; the challenge is to meet out additional requirements like design of a compact system with less weight and volume/space of the system components. Further, the demand leads to the development of systems with high 'functional density' and inherited 'smartness', also to overcome technical and commercial restrictions, operating environment, response time and allowable cost. The smart/intelligent system should cater to the dynamic control, which demands highly dexterous sensing and actuation. The most promising sensing and actuation solutions, including self sensing actuation and shared sensing and actuation can be offered only by the specific group of functional materials- the smart materials. A smart/intelligent and adaptive control is possible in almost every sector by the choice of the suitable smart material that is suitably configured in the system design, along with reliable control law and electronics. Keywords smart structures, sensors, actuators, self sensing actuation, MEMS, energy harvesting