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ADVANCED PIEZOELECTRIC THIN-FILM MATERIALS FOR ACTUATOR AND SENSOR APPLICATIONS

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Abstract: Piezoelectric materials produce electric charges on their surfaces as a consequence of applying mechanical stress or vice versa. They are used in the fabrication of a growing range of devices such as transducers (such as ultrasonic acoustic wave), actuators (microfludic pump), pressure sensor devices (gyroscopes), mass sensor devices (biological detection, SAW), and increasingly as a way of producing energy (energy harvester). In this paper, piezoelectric thin films based on lead-compound (PZT, PMN-PT), lead-free materials (BTO, BFO, AlN) and their fabrication techniques (PLD, sputtering and sol-gel) will be presented. The fabrication techniques for the integration of these films for microactuator and microsensor applications, as well as their characterizations, have been also investigated.