Title Of Invention: ACOUSTIC DEVICES WITH RESIDUAL STRESS COMPENSATION AND FEEDBACK CONTROL OF ACOUSTIC RESISTANCE

ABSTRACT

An acoustic sensor (e.g., for use in a piezoelectric MEMS microphone) includes a substrate and a cantilever beam attached to the substrate. The cantilever beam has a proximal portion attached to the substrate and extends to a distal tip at a free end thereof. The cantilevered beam has a multilayer structure with a plurality of piezoelectric layers and a plurality of metal electrode layers, at least a portion of one of the piezoelectric layers interposed between two metal electrode layers. One or more direct current voltage sources are electrically connected to one or more of the plurality of metal electrode layers and configured to apply a direct current bias voltage between at least two of the plurality of metal electrode layers to deflect the cantilever beam to at least partially counteract a deflection of the cantilever beam due to a residual stress in the cantilever beam. A feedback control circuit is electrically connected to one or more of the metal electrode layers and applies a direct current bias voltage between at least two of the metal electrode layers to actively control an acoustic resistance of the piezoelectric sensor.

[FIG. 3]