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Sensitivity Evaluation of the Nanostructure-Enhanced BAW Mass Sensor

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The general implementation concept of the mass sensor based on membrane bulk acoustic wave resonator with nanostructured sensing layer was presented. The 3-dimensional finite element model of the thin film bulk acoustic wave resonator was built to estimate its sensitivity. It was shown that application of the nanostructured ZnO with large effective surface area provided the 20 times sensitivity increase over the polycrystalline sensing layer. The performance characteristics of the proposed sensor at the appointed conditions were described in details.