

## عنوان مقاله:

Simulation of a High Sensitive Piezoresistive Force Microsensor

## محل انتشار:

کنفرانس بین المللی تحقیقات بنیادین در مهندسی برق (سال: 1396)

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## خلاصه مقاله:

A new design was proposed for a highly sensitive piezoresistive force microsensor capable of measuring forces in the 20-120 nN range. This microsensor included a microcantilever and a number of piezoresistors as well as connections for measuring the force applied to the microsensor. The longitudinal and transverse stresses, voltage changes along the piezoresistors, microsensor resistance changes, and maximum free-end displacement of the microcantilever under different forces were investigated. To optimize the microsensor sensitivity, the corresponding effects of creating a hole at the microcantilever end, reducing the sensor thickness at the connection of the microcantilever to the base, and decreasing the piezoresistor width on the sensitivity of the sensor were examined, while other parameters were kept constant. To investigate the behavior of the optimized microsensor, maximum displacement of the microcantilever, von-Mises stress distribution in the microcantilever, piezoresistor resistance changes under different forces, and resonant mode shapes were simulated through the finite element method. This optimization increased the microsensor sensitivity by almost 57 times from  $0.023 \Omega/\mu\text{m}$  in the reference microsensor to  $1.31 \Omega/\mu\text{m}$ .

## کلمات کلیدی:

Micro-electromechanical Systems, Force Microsensor, Piezoresistive, Finite Element, Simulation

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/673109>

