

Design of MEMS-based Microcantilever for Tuberculosis Detection

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Abstract

Tuberculosis is infectious disease caused by various strains of *Mycobacterium tuberculosis*. The detection is very difficult because their mechanism is not well understood, and it is mainly based on the γ interferon which is normally secreted by the T-cell of the body. The RD1 region is genomic and is present in all strains of *Mycobacterium tuberculosis*. The ESAT-6/CFP-10 complex is secreted by the ESX-1 secretion system, also known as the RD1 region. It is expressed as a surface antigen. The fusion protein of ESAT-6/CFP-10 antibody is 24KDa. It interacts with the surface antigen and enables detection. The cantilever structure on silicon substrate with gold-coated film has been designed and simulated using COMSOL Multiphysics®. The simulation results include the stress, displacement measurements, Eigen function study, concentration optimization and the best suited type of cantilever for the detection.

Figures used in the abstract

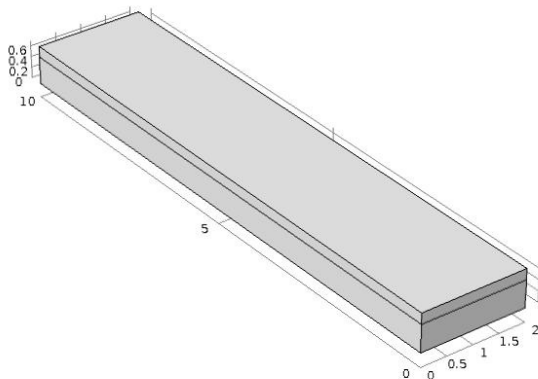


Figure 1: schematic of rectangular shaped cantilever sensor

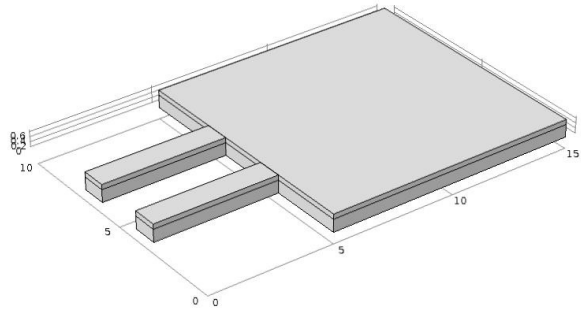


Figure 2: schematic of pi shaped cantilever sensor



Figure 3: schematic of triangular shaped cantilever sensor