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Title

A symmetric metamaterial element-based RF biosensor for rapid and label-free detection

Source

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Abstract

A symmetric metamaterial element-based RF biosensing scheme is experimentally demonstrated by detecting biomolecular binding between a prostate-specific antigen (PSA) and its antibody. The metamaterial element in a high-impedance microstrip line shows an intrinsic S(21) resonance having a Q-factor of 55. The frequency shift with PSA concentration, i.e., 100 ng/ml, 10 ng/ml, and 1 ng/ml, is observed and the changes are Delta f approximate to 20 MHz, 10 MHz, and 5 MHz, respectively. The proposed biosensor offers advantages of label-free detection, a simple and direct scheme, and cost-efficient fabrication.