Chemical Sensing in Fourier Space

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Abstract

A novel approach of chemical sensing using optical diffraction is demonstrated. Properly fashioned arrays of micromachined silicon and silicon nitride cantilevers containing embedded deformable diffraction gratings are functionalized with chemically selective coatings. Adsorption of specific molecules on the cantilever leads to bending, which changes the diffraction pattern of a laser beam reflecting off the array. Quantitative chemical information can be obtained by monitoring the displacement of diffraction peaks as a function of analyte exposure. Application in chemical and biochemical sensing will be discussed.