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Cantilever Arrays for Multiplexed Analysis of Chemical and Biomolecular Reactions

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Cantilever beams have been used to mechanically detect and quantitatively analyze multiple reactions in gaseous and aqueous media. The reaction- induced deflection of a cantilever beam reflects the interplay between strain energy increase of the beam and the free energy reduction of a reaction, providing an ideal tool for investigating the connection between mechanics and chemistry of reactions. Since free energy reduction is common for all reactions, the cantilever array forms a universal platform for label-free detection of various reactions. While the science underlying chemical-to-mechanical free energy transduction is still being understood, the technological potential can be truly realized if multiple reactions can be detected simultaneously. This talk will focus on both the scientific understanding as well as the technological progress in the development of cantilever-based analysis of chemical and biomolecular reactions.