

Supporting Information

Charge-Sensitive Optical Detection of Binding Kinetics between Phage-Displayed Peptide Ligands and Protein Targets

Runli Liang ^{1,2}, Yingnan Zhang ³, Guangzhong Ma ¹ and Shaopeng Wang ^{1,4,*}

¹ Biodesign Center for Bioelectronics and Biosensors, Arizona State University, Tempe, AZ 85287, USA; rliang3@asu.edu (R.L.); guangzho@asu.edu (G.M.)

² School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ 85287, USA

³ Department of Early Discovery Biochemistry, Genentech, South San Francisco, CA 94080, USA;

zhang.yingnan@gene.com

⁴ School of Biological and Health Systems Engineering, Arizona State University, Tempe, AZ 85287, USA

* Correspondence: shaopeng.wang@asu.edu

S1. Noise spectrum of CSOD system

The noise of the CSOD system was analyzed by using a large-diameter fiber. The fiber was dipped into a PBS solution similar to the experimental conditions. No electric field was added. Images of fiber tip were collected at 2000 frames per second using a fast CMOS camera (Mikrotron EoSens 3CXP).

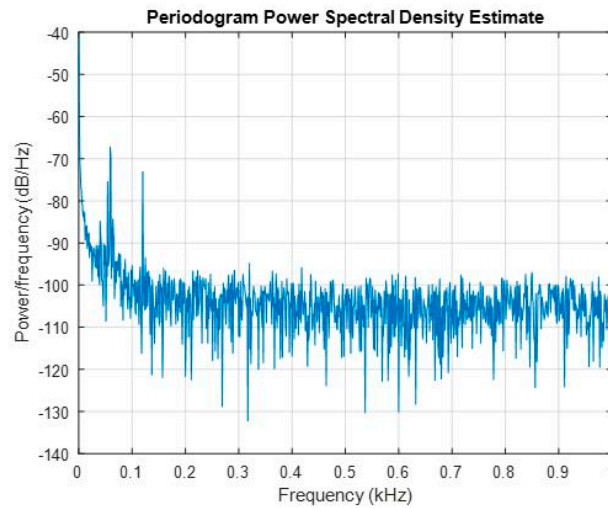


Figure S1. CSOD system noise analysis. Frequency analysis of a fiber tip imaged at 2000 frames per second without an electric field. Fiber diameter: 125 μm ; length: 10 mm.

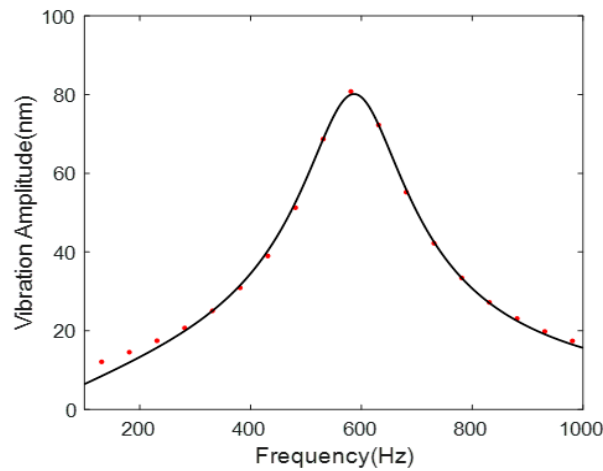


Figure S2. Frequency dependency of the oscillation amplitude of a large diameter fiber. The red dots are experimental data, and the solid line is calculated from Equation 1. Fiber diameter: 105.6 μm ; length: 9.8 μm . Buffer: 40 times diluted 1X PBS buffer.

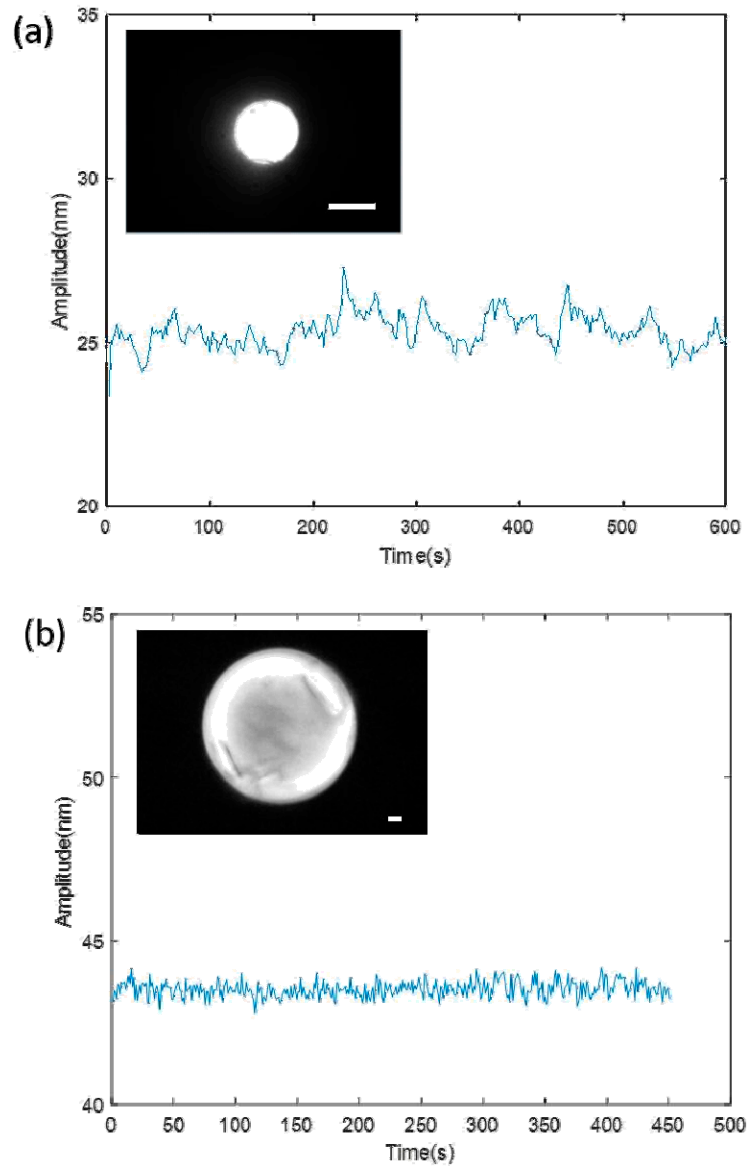


Figure S3. Comparison of CSOD signal long-term stability for small and large diameter fibers. (a) Small fiber with diameter 13.8 μm and length 9.0 mm oscillates at 35 Hz and recorded at 100 fps, 2 second per FFT amplitude data point. Average signal: 24.96 nm; noise (standard deviation) = 0.51nm. (b) Large fiber with diameter 112.0 μm and length 10.0 mm oscillates at 481 Hz, recorded at 2000 fps, 1 second per FFT amplitude data point. Average signal: 44.33 nm; noise (standard deviation) = 0.25 nm. The scale bar is 10 μm .