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Electronic Supplementary Information (ESI)

A Siphonage Flow and Thread-based Low-cost Platform Enables Quantitative and Sensitive Assays

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Figure S1. Demonstration of the successful immobilization of glucose oxidase and uric acid oxidase on the cotton threads. The histogram is the CL signals arising from injecting 400 μ L of the mixed solution luminol and potassium ferricyanide into the respective resultant solution by incubating 10 cm of control cotton thread, glucose oxidase pre-immobilized cotton thread, and uric acid oxidase pre-immobilized cotton thread into 50.0 μ L of 5.0×10⁻⁵ mol/L substrates for 30 min. The negative potential applied to PMT was -600 V. Inset is the photos of the results obtained by Bradford method. The error bars represent ± SD for triplicate measurements.



Figure S2. Photo of measuring the flow rate of water along polyester cotton blend thread introduced by siphonage action. Photo A is the front view of measurement. Photo B is the top view of measurement.



Figure S3. Optimum experimental variables for hydrogen peroxide and off-thread glucose measurements. Figure S3(a-c) showed the effect of pH of the reaction medium, luminol concentration and potassium ferricyanide concentration on the relative CL intensity on the determination of 3.0×10^{-7} mol/L hydrogen peroxide. The optimum experimental conditions were of 0.1 mo/L carbonate buffer (pH 10.5), 5.0×10^{-4} mol/L luminol and 1.0×10^{-2} mol/L potassium ferricyanide. Figure S3(d) showed the effect of GOD concentration on the relative CL intensity by using 1.0×10^{-5} mol/L glucose standard. The suitable concentration of glucose oxidase was found to be 15 U/mL. The negative potential applied to PMT was -600 V for all above experiments. The error bar represented the standard deviation of five measurements. The error bars represent ±SD for triplicate measurements.



Figure S4. Optimization of experimental variables for sensor uric acid measurements.

Figure S4 showed the effect of the pH of the reaction medium, luminol concentration, potassium ferricyanide concentration on the determination of 5.5×10^{-5} mol/L uric acid. The relative CL intensity exhibited the maximum at the conditions of 0.1 mo/L carbonate buffer (pH 10.5), 5.0×10^{-4} mol/L luminol and 1.0×10^{-2} mol/L potassium ferricyanide. The negative potential applied to PMT was -800 V. The error bar represented the standard deviation of five measurements.