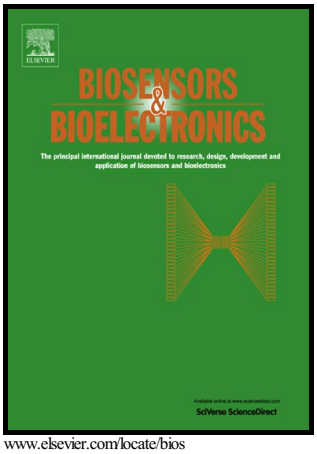

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Chemiluminescence cloth-based glucose test sensors (CCGTSs): a new class of chemiluminescence glucose sensors

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Abstract

Chemiluminescence (CL) has been widely applied in many fields, but it is rarely used in a very simple, economical but effective way. In this work, for the first time, the CL cloth-based glucose test sensors (CCGTSs) are developed as a new class of CL glucose sensors, with no need for complicated, expensive device fabrication and peripheral equipment. When integrated with desirable hydrophobic barrier in the flow channel and gravity/capillary flow induced by a difference in height between the loading zone and the detection zone, a single cloth-based device can perform the whole CL process involving two steps of enzyme reactions. The wax screen-printing approach is used to fabricate ultra-cheap CCGTSs, the glucose detection involves the enzymatic oxidation of glucose to gluconic acid and H_2O_2 followed by the horseradish peroxidase (HRP)-catalyzed oxidation of luminol by H_2O_2, and the emitted CL signals are heightened with p-iodophenol (PIP) and imaged using an inexpensive, portable CCD camera. Under optimized conditions, glucose can be determined