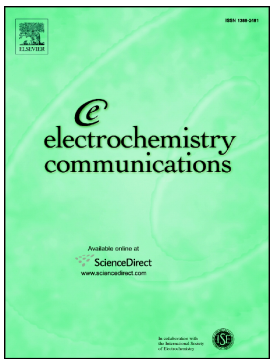

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Magneto-controlled photoelectrochemical sensor for sensitive monitoring of telomerase activity based on removal of electron acceptors mediated by G-quadruplex/hemin complexes

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ABSTRACT

Herein we report on a novel magneto-controlled photoelectrochemical (PEC) sensor for sensitive detection of telomerase activity based on an electron-acceptor elimination strategy. For telomerase activity sensing, a telomerase substrate (TS) primer is anchored on the surface of magnetic beads (MBs). Under telomerase catalysis, the TS primer is extended to generate longer G-rich single strand DNA, which can bind with hemin to form G-quadruplex/hemin complexes. Based on this mechanism, the resulting MBs are used to capture hemin molecules in electrolyte solution and reduce their concentration. Since hemin acts as electron acceptor for a *p*-$CuBi_2O_4$ nanorod-based photocathode, a decrease in hemin concentration will lead to a decreasing photocurrent signal. By recording the decay of the photocurrent, the telomerase activity can be monitored with high sensitivity. Under optimal conditions, the developed sensor allows measurement of telomerase activity in cell extracts over the range 100–2000

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