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## Porous silicon biosensors for miRNA detection

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MicroRNA (miRNA) is a group of endogenous non-coding single-stranded RNA fragments with length of 18-25 nucleotides, which regulate a vast range of physiological and pathological processes. Recently, miRNAs have been demonstrated as a new batch of promising diagnostic and prognostic biomarkers for various diseases, especially for the early-stage symptoms compared with certain protein biomarkers. As a consequence, developing a rapid and reliable detection methods for miRNAs is of great significance in early diagnosis and clinical management. Here we reported a nanochannel-based electrochemical sensor for detection of miRNAs in complex matrices such as serum and milk. By using the thermal decomposition method of acetylene gas, the fabricated hydrogen-terminated thermally hydrocarbonised porous silicon (THCpSi) exhibited high stability and could be utilised as an excellent electrochemical platform. With the help of versatile surface chemistry, the complementary single strand DNA molecules could be easily immobilised on the surface of THCpSi. Differential pulse voltammetry (DPV) measurements demonstrated that the detecting miRNAs by THCpSi-based biosensor was successfully achieved, showing a perfect linear relationship as a function of miRNA concentrations. The rapid response time (only 15 minutes) and high sensitivity of our biosensor facilitate the clinic practice of miRNAs in medical diagnosis and suggest great potential in developing the point-of-care device.