

## Ultrasensitive Hepatitis B Virus Detection in Blood Using Nano-Porous Silicon Oxide: Towards POC Diagnostics

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**Abstract :** Early diagnosis of infection like Hep-B virus in blood is important for low cost medical treatment. For this purpose, it is desirable to develop a point of care device which should be able to detect trace quantities of the target molecule in blood. In this paper, we report a nanoporous silicon oxide sensor which is capable of detecting down to 1fM concentration of Hep-B surface antigen in blood without the requirement of any centrifuge or pre-concentration. This has been made possible by the presence of resonant peak in the sensitivity characteristics. This peak is observed to be dependent only on the concentration of the specific antigen and not on the interfering species in blood serum. The occurrence of opposite impedance change within the pores and at the bottom of the pore is responsible for this effect. An electronic interface has also been designed to provide a display of the virus concentration.

**Keywords :** impedance spectroscopy, ultrasensitive detection in blood, peak frequency, electronic interface

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