

The sensing mechanism and detection of low concentration acetone using chitosan-based sensors.

Abstract

This paper aims to discuss the usage of chitosan film sensors to detect acetone concentrations in human breath, in order to precisely diagnose diabetes mellitus in patients. Acetone concentration in the breath varies from 0.3 to 0.9 ppm in healthy people to more than 1.8 ppm for diabetics. This makes acetone a suitable chemical marker for diabetes diagnosis. Therefore, the preliminary study on the electrical laboratory testing of the chitosan film sensor properties to acetone vapor-contaminated air in range of 0.1-100 ppm was carried out at room temperature (~25-30 °C) in normal air. Our results suggested that the proposed acetone-based gas sensor can operate at room temperature with a high performance demonstrated by good response, recovery, stability and repeatability. This trouble free, painless and steadfast technique will improve the current gold standard in diagnosing diabetes, enabling quick and early detection.