The Fabrication of Nano Sensor Technology to Detect Blood Glucose Levels in the Breath of Diabetic Patient

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Diabetes is a chronic disease affecting 425 million people and arises from defects in insulin secretion, action or a combination of both, causing high levels of blood glucose. For years, diabetic patients have relied on blood glucose meters to monitor their blood glucose. However, a study by The Diabetes Technology Society (DTS) concluded that only (6) out of a total of (18) Blood Glucose Meters met the passing international standard. Recognizing that they are no longer the optimum testing method for diabetic patients, due to their lack of accuracy and invasiveness, our research aimed to investigate a more accurate and non-invasive method of detecting blood glucose levels. After establishing a correlation between blood glucose levels and acetone in the breath of diabetics, acetone was identified as a biomarker of diabetes and thus we created a material that is able to sense acetone at room temperature, in order for the material to be effectively utilized as part of a future diabetes tracking product. Nano sensor technology and wet chemical synthesis was used to produce the material (Ag/WO3) , which consists of 3% silver (Ag) and 97% Tungsten Oxide (WO3). The sensor was fabricated by creating a paste of the material, which was used to create a coating of 1 mm sensing film on customized pairs of gold electrodes. As the material is receptive to the different concentrations of acetone, we aim to further the implications of our material by embedding it in a product that functions like a breathalyzer and aims to serve as a glucose meter.

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