

MOF-74 Analogues for glucose sorption and/or electrode modifiers for the electrochemical detection of glucose in human perspiration.

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In recent years, the research of new materials for the detection of glucose in human organism has met a great rise due to the importance of this particular analyte's monitoring. Increased concentration of glucose in blood is responsible for diabetes mellitus which can lead to a number of unhealthy complications, the most severe of them being kidney failure, heart disease, and blindness^[1]. Therefore, the development of new materials and methods for the glucose monitoring is of great importance. The most common methods that are currently used commercially rely on immobilized enzymes, which are characterized by good selectivity and high sensitivity. These techniques however, in addition to being costly, suffer from many factors. Variables such as temperature, pH and humidity can affect the sensor's detecting accuracy as a result of the enzyme's activity^[2].

The idea of exploiting Metal-Organic Frameworks' (MOFs) capabilities for this matter has grown more appealing to the scientific community due to the most interesting properties this class of materials present. MOF's are porous coordination polymers based on metal ions or clusters, bridged by organic ligands. In most cases they are characterised by great thermal and water stability, catalytic capabilities, and remarkable porosity. In this work, MOF-74^[3] analogues based on bis-amide ligands are being synthesised in order to study their ability to sorb glucose and/or to be utilized as electrode modifiers for the detection of glucose via electrochemical methods, aiming at the development of wearable devices that are capable of detecting glucose levels in human perspiration.

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References

1. Zhang, D., et al *Talanta* **144**, 1176–1181 (2015).
2. Claussen, J. C., et al *J. Diabetes Sci. Technol.* **4**, 312–319 (2010).
3. Rosi, N. L., et al *J. Am. Chem. Soc.* **127**, 1504–1518 (2005).