A new oxalamide-based 3D Fe-MOF for potential glucose sorption and electrochemical detection in human perspiration via electrode modification.

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Diabetes mellitus is a serious disease, resulting from the insufficiency of insulin in the body, which causes elevated blood-glucose levels (hyperglycemia), or reduced glucose concentrations (hypoglycemia). The continuous monitoring of blood glucose levels in diabetic patients is an important matter as it is shown by the development of electrochemical glucose biosensors throughout the last two decades[1]. In the recent years Metal Organic Frameworks (MOFs) have also been employed for glucose detection through electrode modification[2].

Our research group focus on synthesizing new oxalamide based MOFs and utilizing them for electrochemical sensing[3]. To this end we isolated a new 3D MOF based on zinc, namely $\{[(CH_3)_2NH_2][(Zn(H_4L)_{0.5}(H_2L)_{0.5}\cdot 3DMA]\}_n$ (Zn-MOF), where H_6L is the N,N'-bis(2,4-dicarboxyphenyl)-oxalamide. Unfortunately, the new Zn-MOF decomposes in water. For this purpose, we proceeded to the post modification of the framework by ion-exchanging the zinc with iron or copper in aqueous solutions. The Fe-MOF, which is obtained instantly after the ion-exchange, exhibit water stability and due to his high porosity, is to be studied for glucose sorption. In addition, the Fe-MOF will be tested as an electrochemical electrode modifier for glucose sensing with the intention of developing new wearable glucose sensors for human perspiration.

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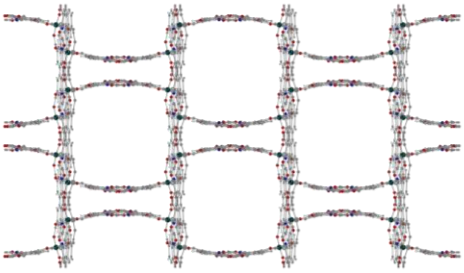

Figure 1: The 3D framework of $\{[(CH_3)_2NH_2][(Zn(H_4L)_{0.5}(H_2L)_{0.5}\cdot 3DMA]\}_n$ (Zn-MOF) viewed down to *c* axis

References

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2. Sehit, E. & Altintas, Z., *Biosens. Bioelectron.* **159**, 112165 (2020).
3. Kokkinos, C., et al. *Sensors Actuators, B Chem.* **321**, (2020).