Enzymatic Electrochemical Biosensor Based on a 2D-Covalent Triazine Framework

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Ordered two dimensional porous materials have been attracted a lot of attention due to their huge potential applications. Several nanoporous frameworks have been obtained such as Zeolites, Metal Organic Frameworks (MOFs) or Covalent Organic Frameworks (COFs). While researchers have studied these materials for energy storage, optoelectronics or even drug delivery, just few studies have been reported on biosensor applications. In addition, MOFs have just been used as electrochemical substrate [1, 2], however, to the best of our knowledge, no study have been reported yet using COFs as a biosensor matrix. In this study, we have carried out synthesis and characterization of triazine-based COF (CTF-1), and the subsequent application on an electrochemical enzymatic biosensor. Electrochemical impedance spectroscopy measurements indicated that the charge transfer resistance (Rct) of gelatine-CTF-1 modified electrode was nearly 20% lower than that the standard gelatine modified electrode (Figure 1). This result shows the conductive nature of the synthesized CTF-1. On the other hand, chronoamperometric measurements were carried out showing that the gelatine-CTF-1-SOD electrode has an amperometric response 25% higher respect to the standard. These findings clearly show that CTF-1 is a promising candidate as electrochemical enzymatic biosensor component.

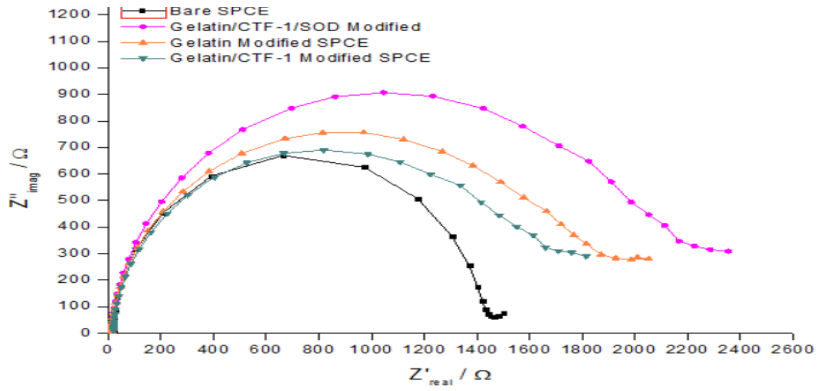

Figure 1: EIS spectra

[1] S. E. Miiler, M. H. Teplensky, P. Z. Moghadam and D. F. Jimenez, Interface Focus. **6** (2016) 20160027.
[2] X. Q. Wu, J. G. Ma, H. Li, D. M. Chen, W. Gu, G. M. Yang and P. Cheng, Chem Commun. **51** (2015) 9161-9164.