Highly Sensitized Metal-Organic Frameworks-Derived Graphene-Based Ammonium Ions Sensor

Mohamed Shuaib Mohamed Saheed[1,2]
Sara Maira Mohd Hizam[1]
Center of Innovative Nanostructures & Nanodevices (COINN), Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak.
Department of Mechanical Engineering, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak.
shuaib.saheed@utp.edu.my

Abstract

Metal-organic frameworks (MOFS) have been investigated extensively as advanced chemical sensors in recent years [1,2]. However, no studies have been conducted yet on MOFs as an ammonium ion sensor. Presented herein is a MOFs-derived tungsten oxide/reduced graphene oxide (MOFs-WO_3/rGO) that exhibits not only remarkable sensitivity sensing for traces of ammonium ion (LOD = 6.413 ppb and LOQ = 19.415 ppb) but also excellent selectivity (K^+, Na^+, F^-, and SO_4^{2-}) repeatability and stability up to 4 weeks [3]. The remarkable sensing performance of the nanocomposites due to the incorporation of reduced graphene oxide as an organic linker provides an excellent platform for early screening of hazardous contaminated ions in water reservoirs for cleaner water resources in the future.

References

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[2] S. Wang et al., "Fabrication of robust and cost-efficient Hoffmann-type MOF sensors for room temperature ammonia detection," Nature Communications, vol. 14, no. 1, p. 7261, 2023.

[3] S. M. Mohd Hizam and M. S. Mohamed Saheed, "Facile Electrochemical Approach Based on Hydrogen-Bonded MOFs-Derived Tungsten Ethoxide/Polypyrrole-Reduced GO Nanocrystal for ppb Level Ammonium Ions Detection," Chemosensors, vol. 11, no. 3, p. 201, 2023.

Figures

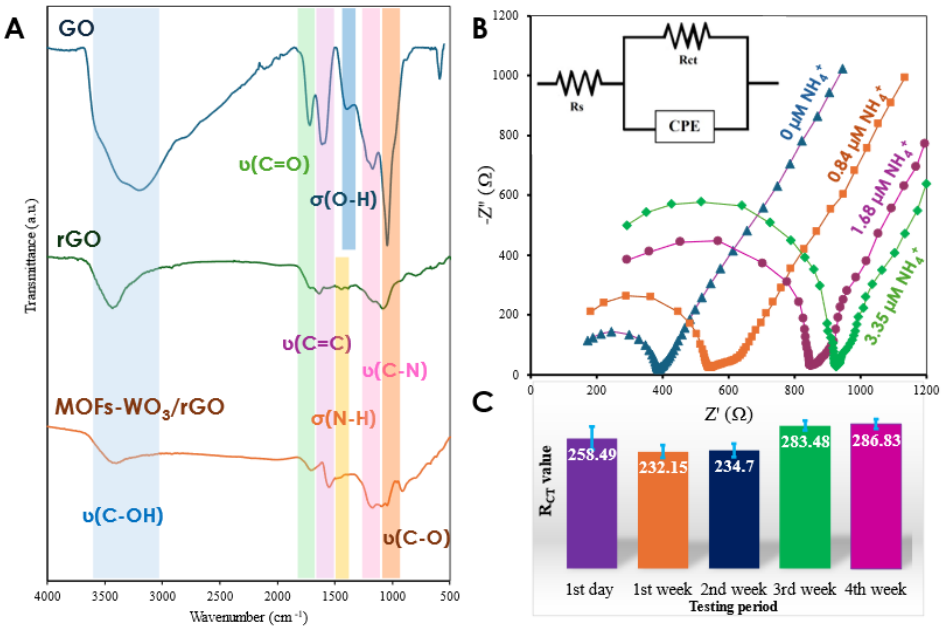

Figure 1: A) FTIR spectra of the GO, rGO and MOFs-WO_3/rGO, B) Nyquist plots and equivalent circuit of MOFs-WO_3/rGO-drop-coated SPE by variation concentrations of analyte, and C) Stability test of MOFs-WO_3/rGO for a month