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PHOTOELECTROCHEMICAL RESPONSE OF GLUCOSE BIOSENSING FOR BiVO_4 NANOCOMPOSITES

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Photoelectrochemical Biosensors

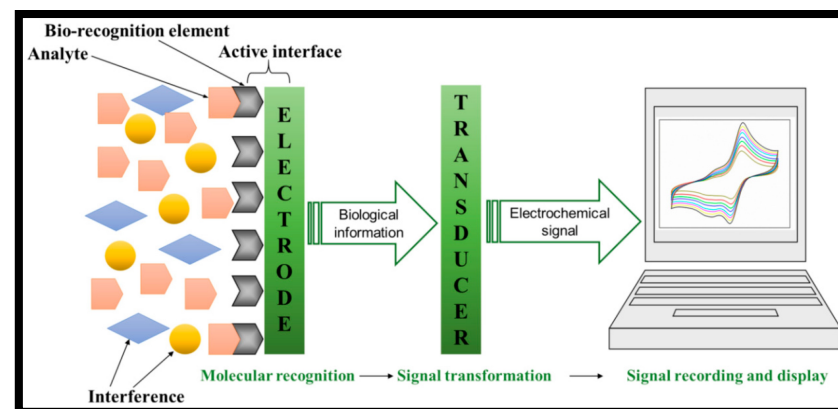
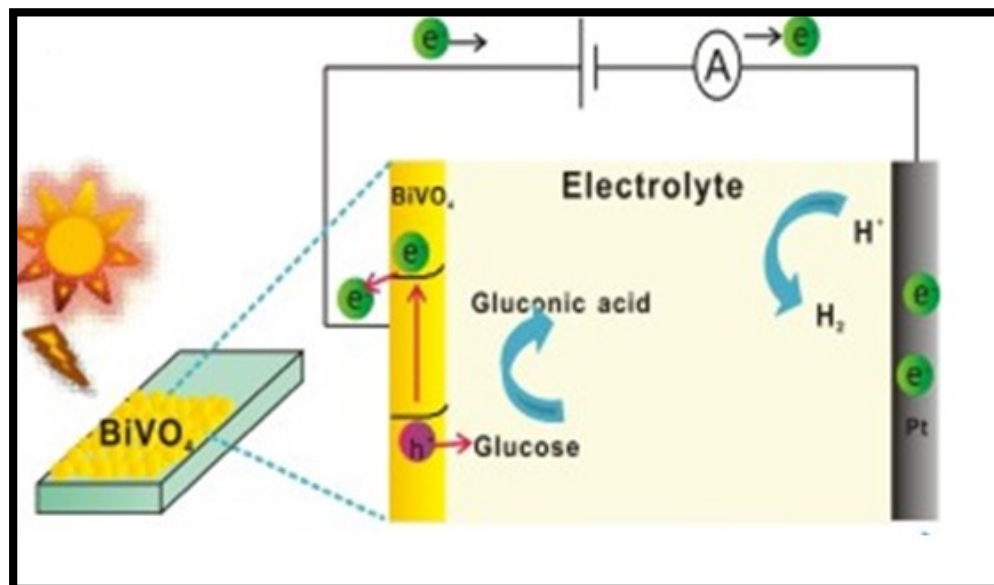


Fig. 1: Schematics for Biosensors [1]

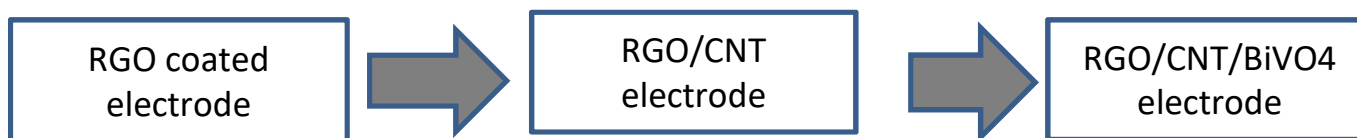


Fig. 2: Schematics for fabrication BiVO₄, CNT/BiVO₄, RGO/BiVO₄ and RGO/CNT/BiVO₄ electrodes [2,3]

UV-VIS Spectroscopy Analysis

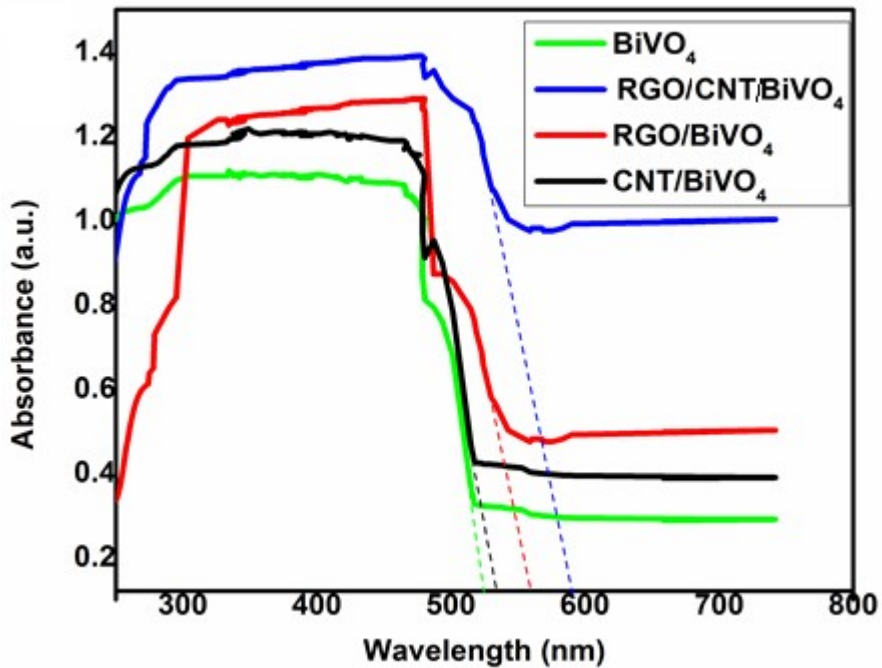


Table1: Bandgap and Absorption edge

	Sample	Bandgap (eV)	Absorption Edge (nm)
1.	BiVO₄	2.46	520
2.	CNT/ BiVO₄	2.30	530
3.	RGO/ BiVO₄	2.16	560
4.	RGO/CNT/ BiVO₄	1.60	600

Fig. 3: UV-VIS Spectrum of BiVO₄, CNT/BiVO₄, RGO/BiVO₄ and RGO/CNTBiVO₄ electrodes [2]

SEM and XRD Analysis

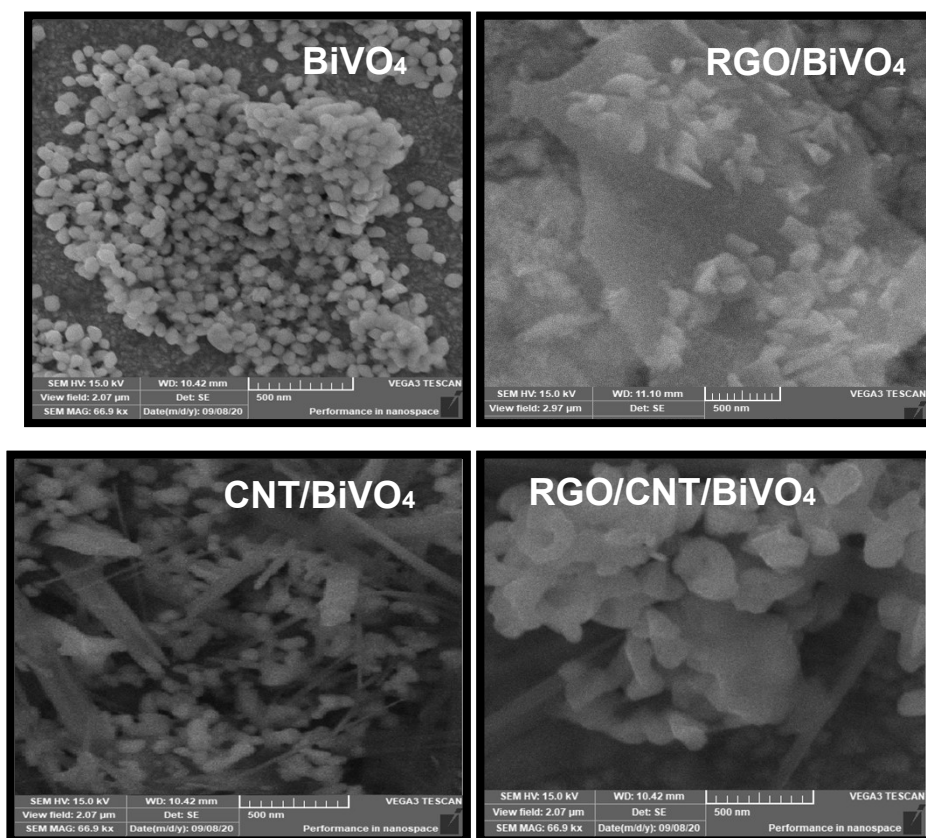


Fig. 4: SEM Image of BiVO_4 , BiVO_4 , CNT/BiVO_4 , RGO/BiVO_4 , CNT/RGO/BiVO_4 Electrodes [2]

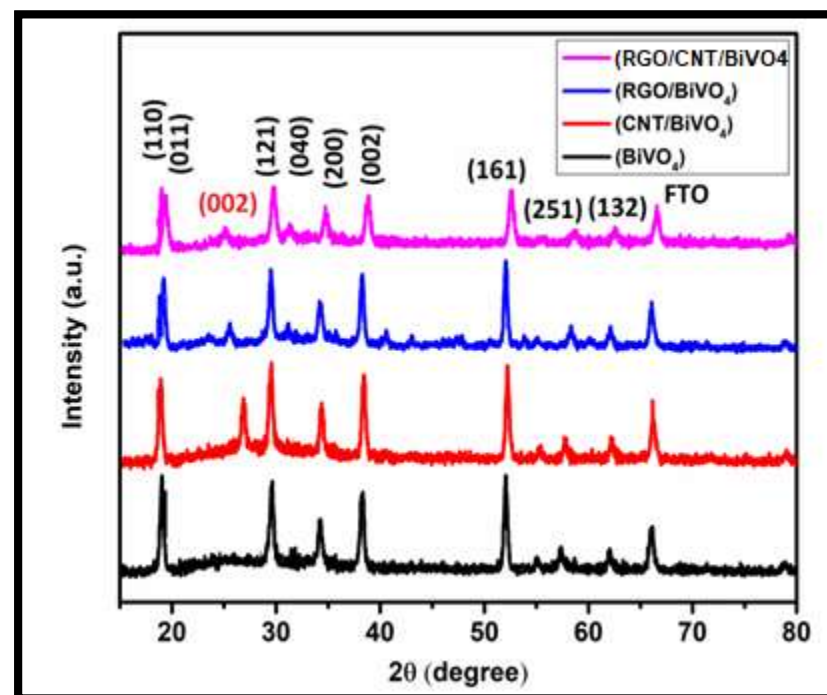


Fig. 5: XRD Analysis of BiVO_4 , CNT/BiVO_4 , RGO/BiVO_4 , CNT/RGO/BiVO_4 Electrodes [2]

Linear Sweep Voltammetry (LSV) Analysis

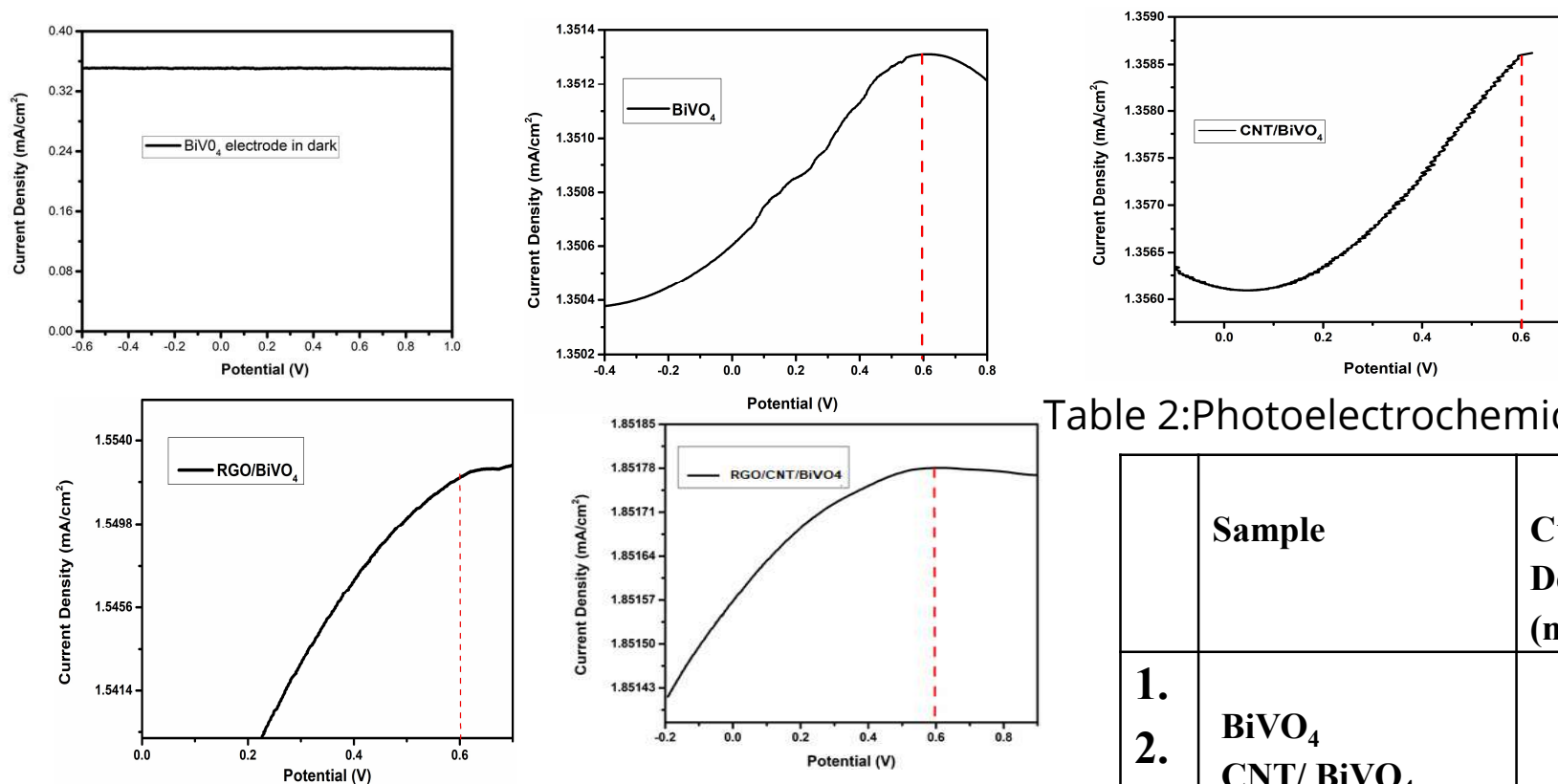


Table 2: Photoelectrochemical Response

	Sample	Current Density (mA/cm ²)
1.	BiVO ₄	1.35038
2.	CNT/ BiVO ₄	1.35823
3.	RGO/ BiVO ₄	1.53261
4.	RGO/CNT BiVO ₄	1.85178 ⁵

Fig. 6: SEM Image of BiVO₄, BiVO₄, CNT/BiVO₄, RGO/BiVO₄, CNT/RGO/BiVO₄ Electrodes under dark and Light [2]

Cyclic Voltammograms

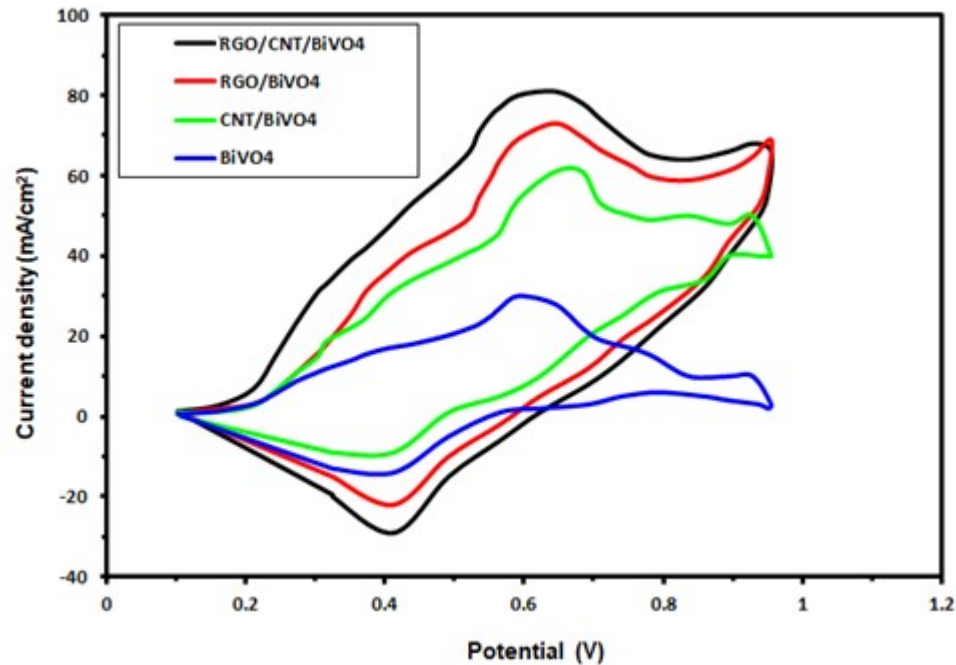


Table3: Glucose Detection Response Using Cyclic voltammograms

	Sample	Current Density (mA/cm ²)
1.	BiVO ₄	30.12321
2.	CNT/BiVO ₄	61.23124
3.	RGO/ BiVO ₄	73.05235
4.	RGO/CNT/ BiVO ₄	81.29234

Fig.7: Cyclic Voltammograms of glucose oxidation for the samples of BiVO₄, CNT/BiVO₄, RGO/BiVO₄, RGO/CNT/BiVO₄ Electrodes [2]

Amperometric Measurements

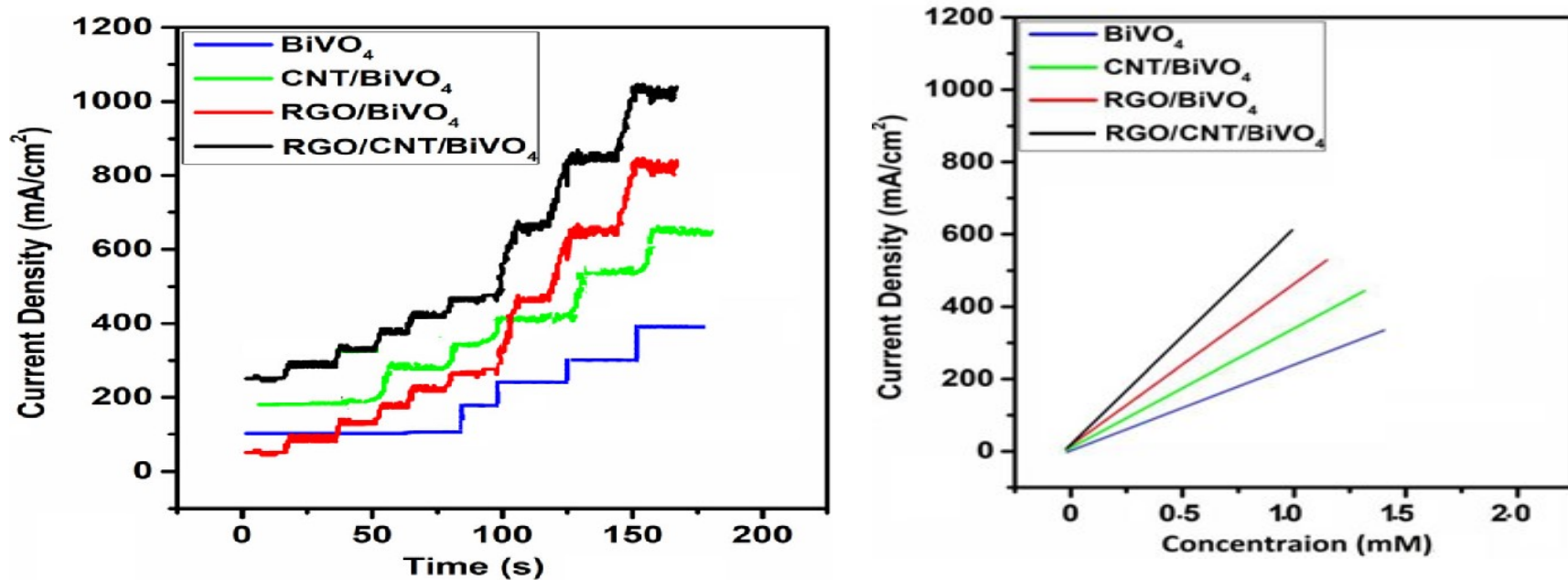


Fig. 8: Amperometric Photocurrent responses of the BiVO₄, CNT/BiVO₄, RGO/BiVO₄ and CNT/RGO/BiVO₄ nanocomposite electrodes with the successive addition of 10 μ M glucose [2].

References

1. Zhang, Z., Zhou, J., & Du, X. (2019). Electrochemical biosensors for detection of foodborne pathogens. *Micromachines*, 10(4), 222.
2. Shabbir, S. A., Imran, A., Ashiq, M. G. B., Latif, H., Javed, K., & Munam, M. (2021). Photoelectrochemical response of non-enzymatic glucose biosensing for graphene, carbon nanotubes and BiVO₄ nanocomposites. *Journal of Materials Science: Materials in Electronics*, 32(13), 17741-17751.
3. Wang, S., Li, S., Wang, W., Zhao, M., Liu, J., Feng, H., ... & Hao, W. (2019). A non-enzymatic photoelectrochemical glucose sensor based on BiVO₄ electrode under visible light. *Sensors and Actuators B: Chemical*, 291, 34-41.

Acknowledgement

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