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Title	Carbon fibre cloth-supported iridium oxide/polyaniline bilayer electrode for solid-state potentiometric pH sensing
Authors	Rasel, Md;Jamal, Mamun;Padmanathan, N.;Razeeb, Kafil M.
Publication date	2026-07-23
Original Citation	Rasel, M, Jamal, M, Padmanathan, N & Razeeb, K M 2026, 'Carbon fibre cloth-supported iridium oxide/polyaniline bilayer electrode for solid-state potentiometric pH sensing', RSC Advances, vol. 16, no. 38, pp. 42528-42539. https://doi.org/10.1039/d6ra05424b
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.scopus.com/pages/publications/105046215353 - 10.1039/d6ra05424b
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Supporting Information

Carbon Fibre Cloth-Supported Iridium Oxide/Polyaniline Bilayer Electrode for Solid-State Potentiometric pH Sensing

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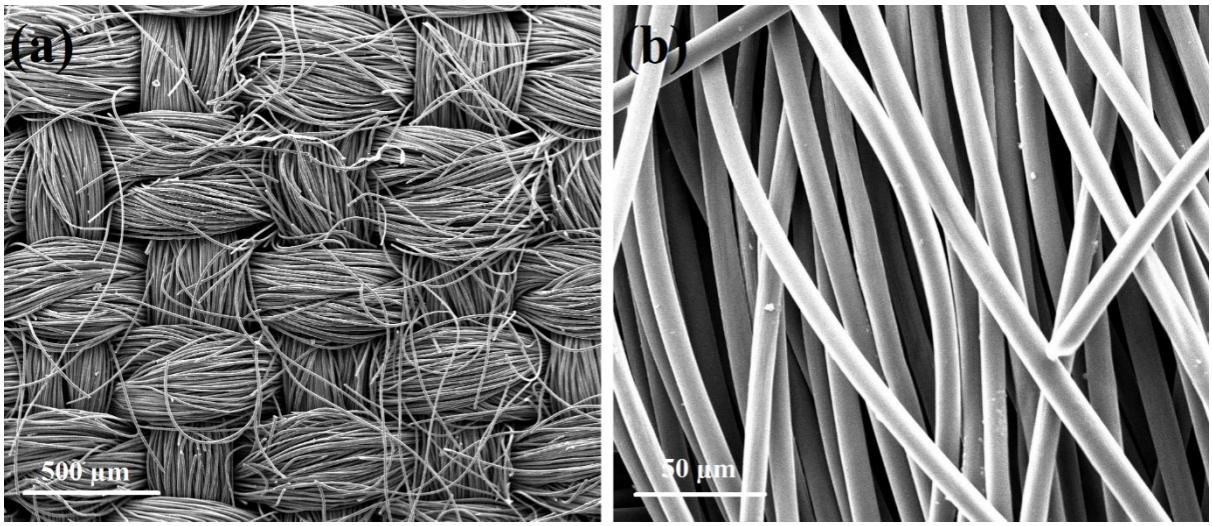

Fig. S1. SEM images of bare CFC at different magnifications.

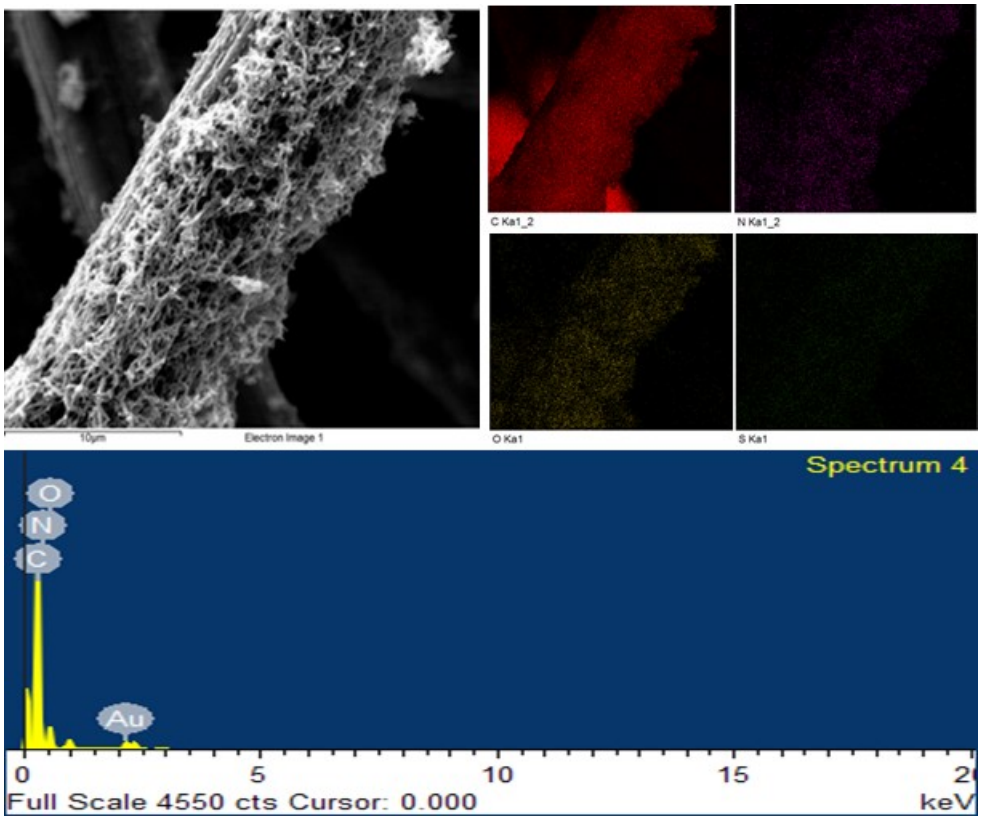

Fig. S2. EDX mapping of PANI modified CFC electrode.

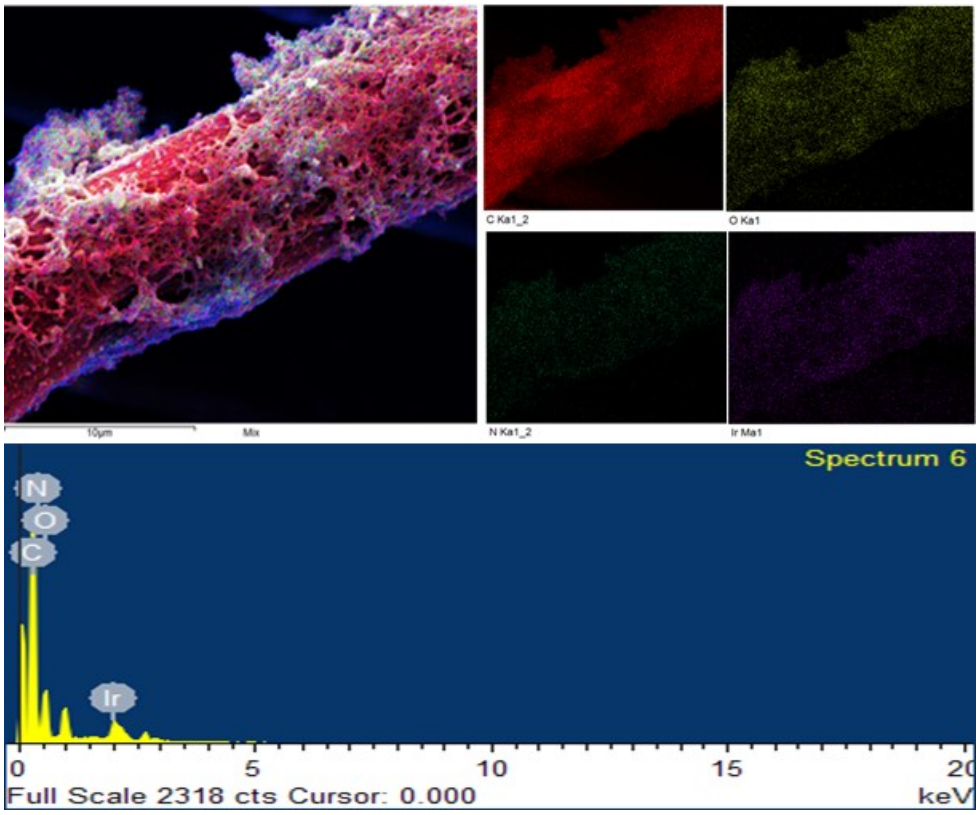

Fig. S3. EDX mapping of IrO_2-PANI/CFC electrode.

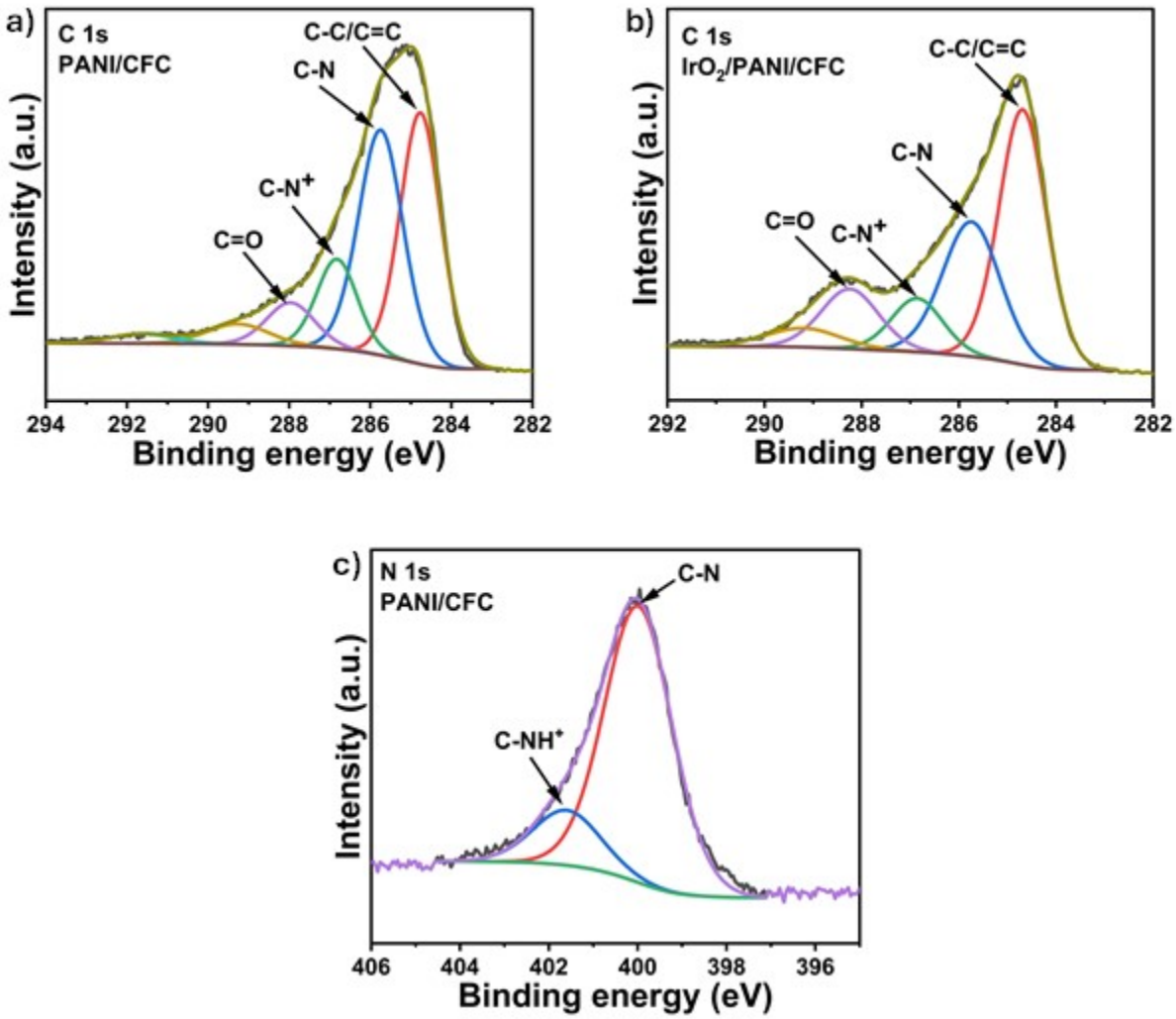

Fig. S4. Additional high-resolution XPS fitting profiles of the modified electrodes. (a, b) C 1s spectra of PANI/CFC and IrO_2/PANI/CFC, respectively; (c) N 1s spectra of PANI/CFC showing neutral C–N and protonated C–NH^+ nitrogen species associated with the PANI backbone.

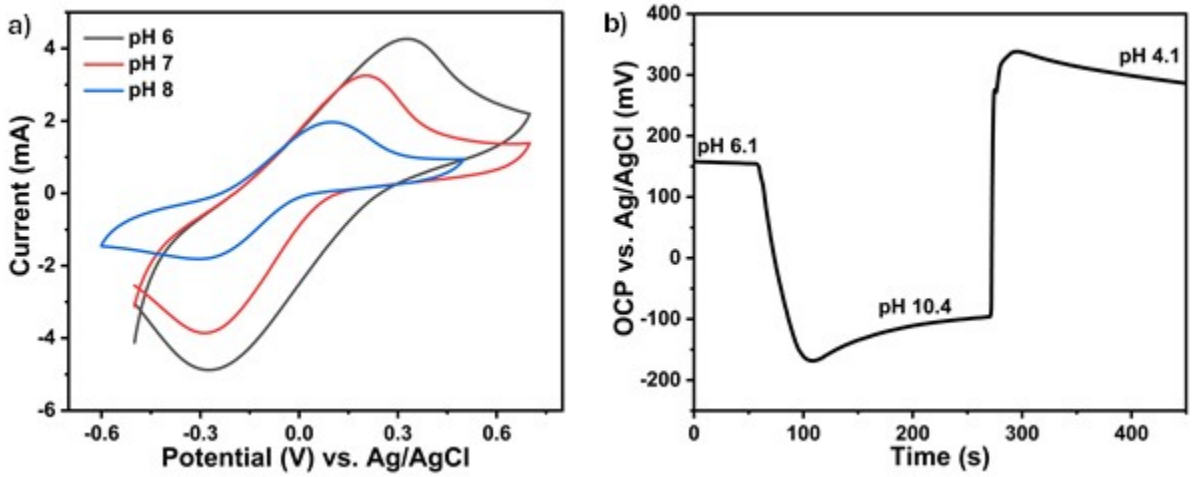

Fig. S5. (a) Cyclic voltammograms of IrO_2/PANI/CFC electrode at different pH buffer conditions (acidic, neutral and basic); (b) Reversibility test of IrO_2/PANI/CFC electrode in acidic and basic medium.

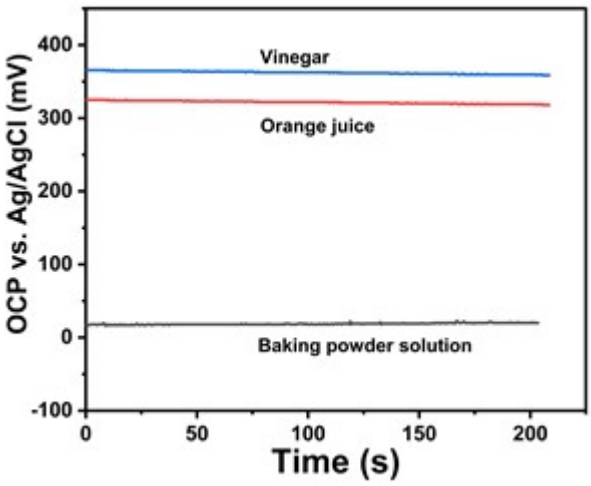

Fig. S6. OCP response of the IrO_2/PANI/CFC electrode in real samples (vinegar, orange juice and baking powder solution).

Table S1. Comparison of the sensing performance of the IrO_2/PANI/CFC electrode with previously reported IrO_x, PANI based potentiometric pH sensors.[a]

Electrode Materials	Substrate	pH range	Sensitivity (mV/pH)	Drift	Long-term stability (days)	Real sample	Ref.
PANI-Au NWs	PDMS	4-8	56.1	~ 1.8 mV/h	-	Sweat	[1]
PANI	CFC	4-12	60.9	10 mV/3h	-	Food	[2]
PANI	LIG	4-10	56.7 ± 2.6	8.4 mV/h	42	Ar. urine	[3]
INA	PNA	4-10	69.43	0.76 mV/h	-	Sweat	[4]
PANI-Au	PET	3-8	63.7	0.7 mV/h	-	Sweat	[5]
IrO_x	PI	2-13	60.6	10.5 mV	-	Ar. sweat	[6]
IrO_x	Si-Si_3N_4	1.8-12	82.88	-	32	Tap water	[7]
PANI/$Ni(OH)_2$	NF	3-11	46	2.34 mV/h	-	Food	[8]
PANI-IrO_x	PI/Cu/Au	3-10	40.1 ± 0.5	-	60	Cell culture	[9]
IrO_2/PANI	CFC	3-11	58.4 ± 0.9	~ 9 mV/6h	45	Food	**This work**

[a]PANI-Au NWs, polyaniline gold nanowires; PDMS, polydimethylsiloxane; LIG, Laser-Induced graphene; PNA, polyurethane acrylate nanopillar array; INA, IrO_x-Au nanopillars array; PI, Polyimide; NF, nickel foam.

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