Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Fabrication of laminated and coated Nafion 117 membranes for reduced mass transfer in microbial fuel cell

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Fig S1. FT-IR spectra of pure and sulfonated PVdF membranes

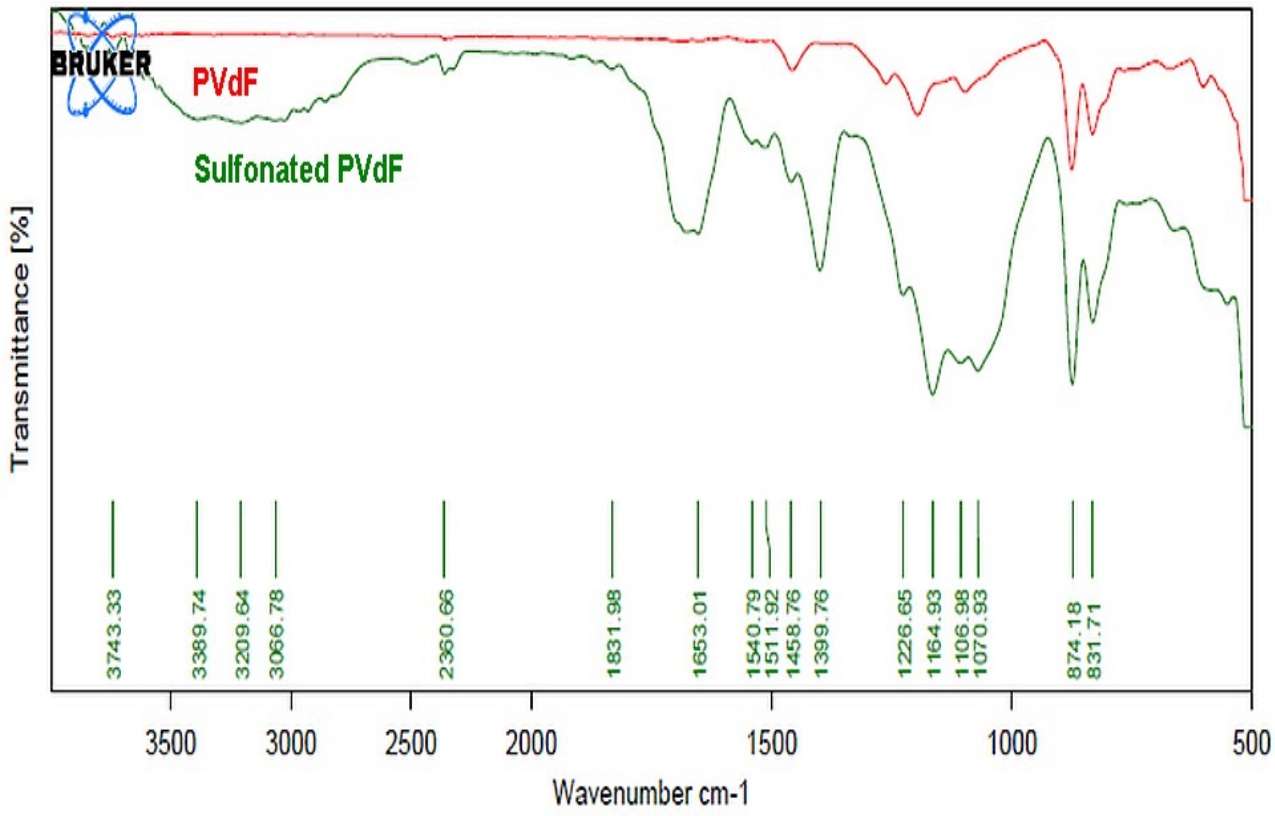

Fig S2. Equivalent circuit representing ohmic resistance (Rm)

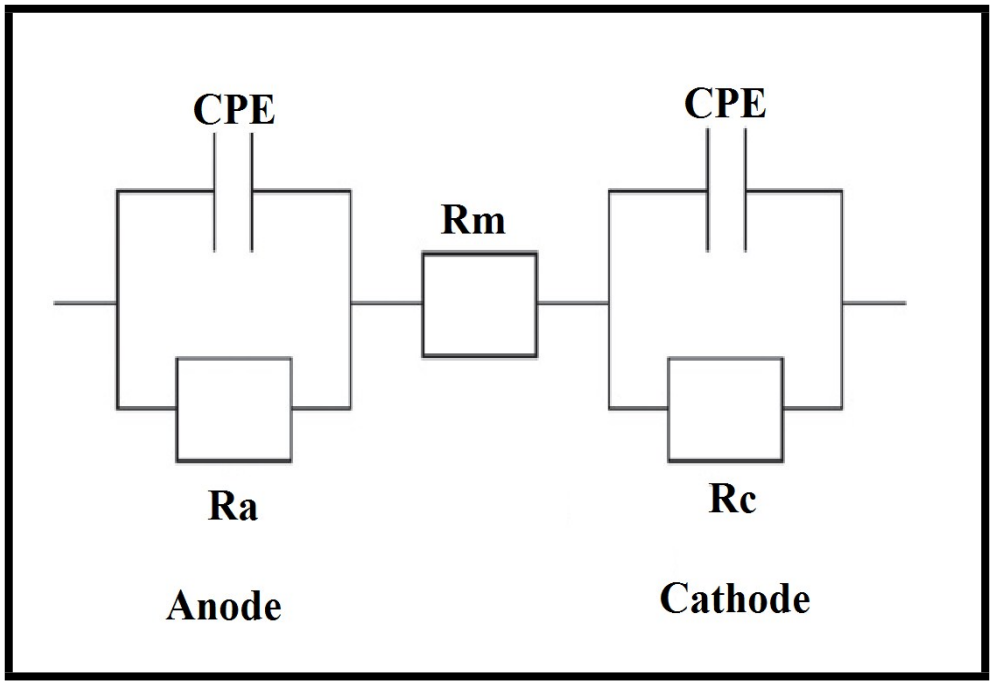

Fig S3. Cell performance at different resistances

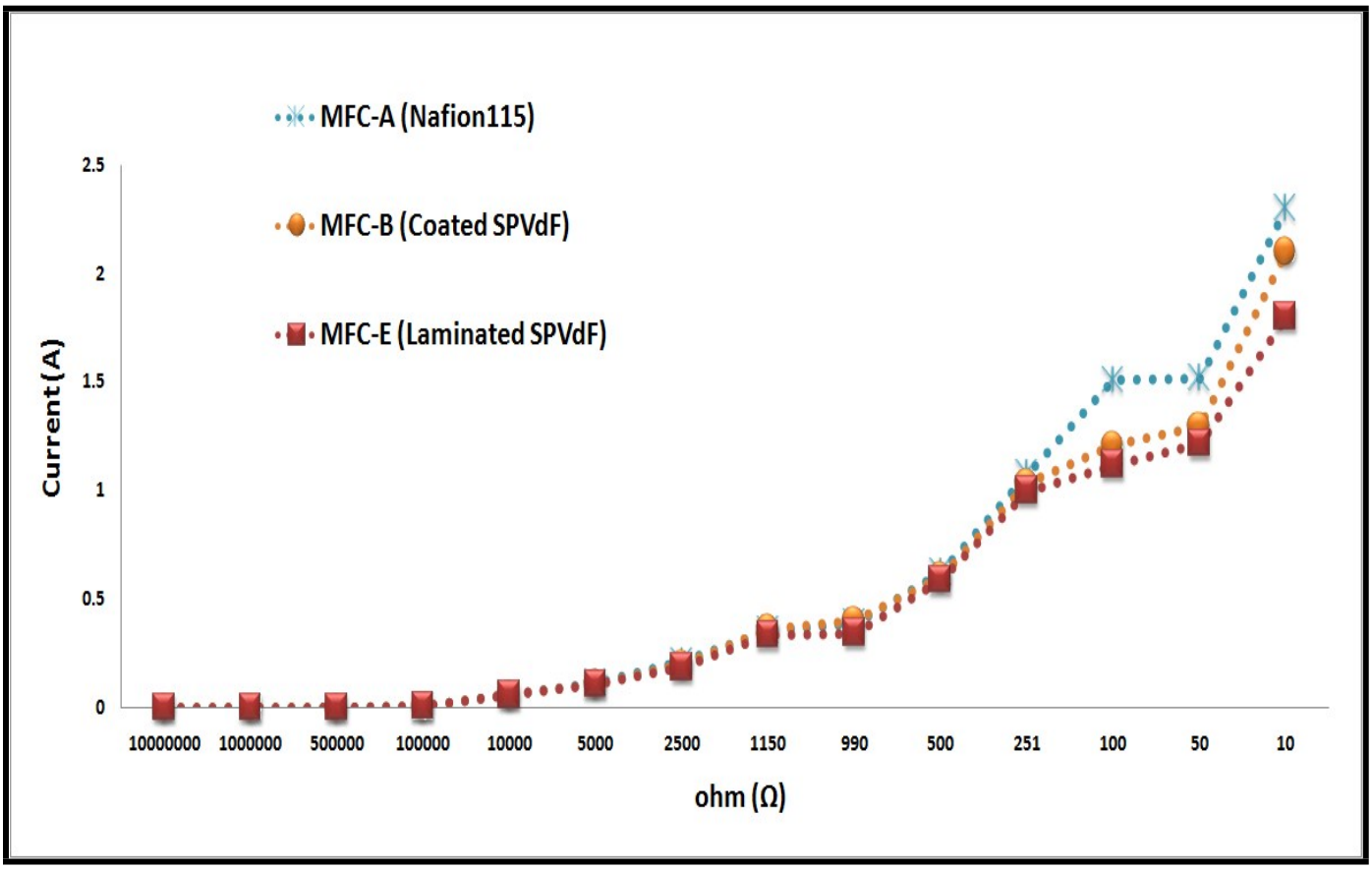

Table T1. A comparative study of MFCs in terms of power generation using different membranes

MFC Type	Electrodes	Used Membranes	Maximum Power density	References
Dual chamber with oxygen flow at cathode	Carbon papers	Nafion 117	600 mWm^{-2}	1
Air cathode MFC	Carbon Brush	Glass fibers	240±22 mWm^{-2}	2
	Carbon Mesh	Coated Glass fibers	230 ± 3.3 mWm^{-2}	
Air cathode MFC	Carbon papers	Nafion 117	239.4 mWm^{-2}	3
Air cathode MFC	Carbon papers	SPEEK/PES	170 mWm^{-2}	4
Dual chamber	Graphite Plates	Fe3O4/PES nanocomposite	20 mWm^{-2}	5
Single chamber (tubular) MFC	Carbon cloths	GO-PVA-STA composite	139 mWm^{-2}	6
Air cathode MFC	Carbon cloths	SPVDF coated/laminated Nafion 117 membrane	446.45 ± 21 mWm^{-2}/ 413.79 ± 20 mWm^{-2}	Present study

References:

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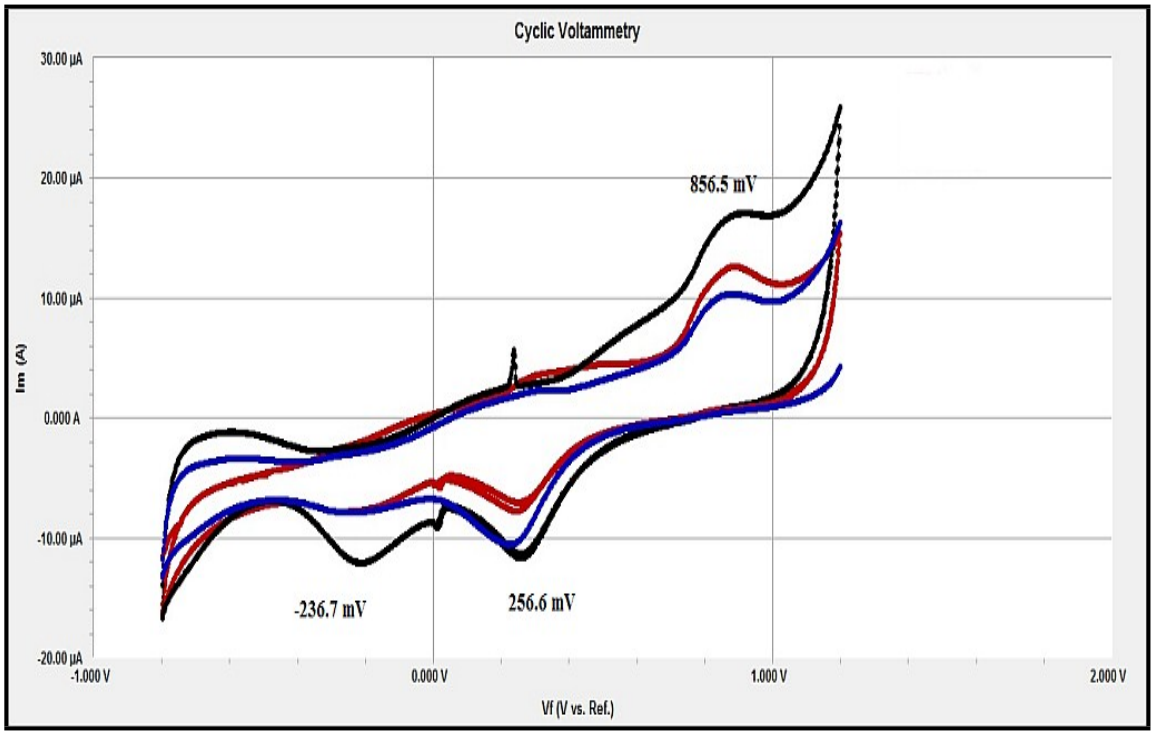
6. Santimoy Khilari, Soumya Pandit, Makarand M. Ghangrekar, Debabrata Pradhan, Debabrata Das, Graphene oxide impregnated PVA-STA composite polymer electrolyte membrane separator for power generation in single chambered Microbial Fuel Cell. Industrial & Engineering Chemistry Research 2013, 52, 11597−11606.

Fig S4. Cyclic voltammogramms of microbes



Electron transfer from biofilm to electrode indicated microbial oxidation, whereas reduction peaks corresponded towards microbial reduction (charge transfer from electrode to biofilm). This redox activity was attributed to the microbial cell surface proteins that evidently ensured its biocatalytic activity, resulting in subsequent substrate utilization from the employed *firmicutes* on repeated potential cycling.

Fig S5. Schematic illustration for proton conductivity measurement.

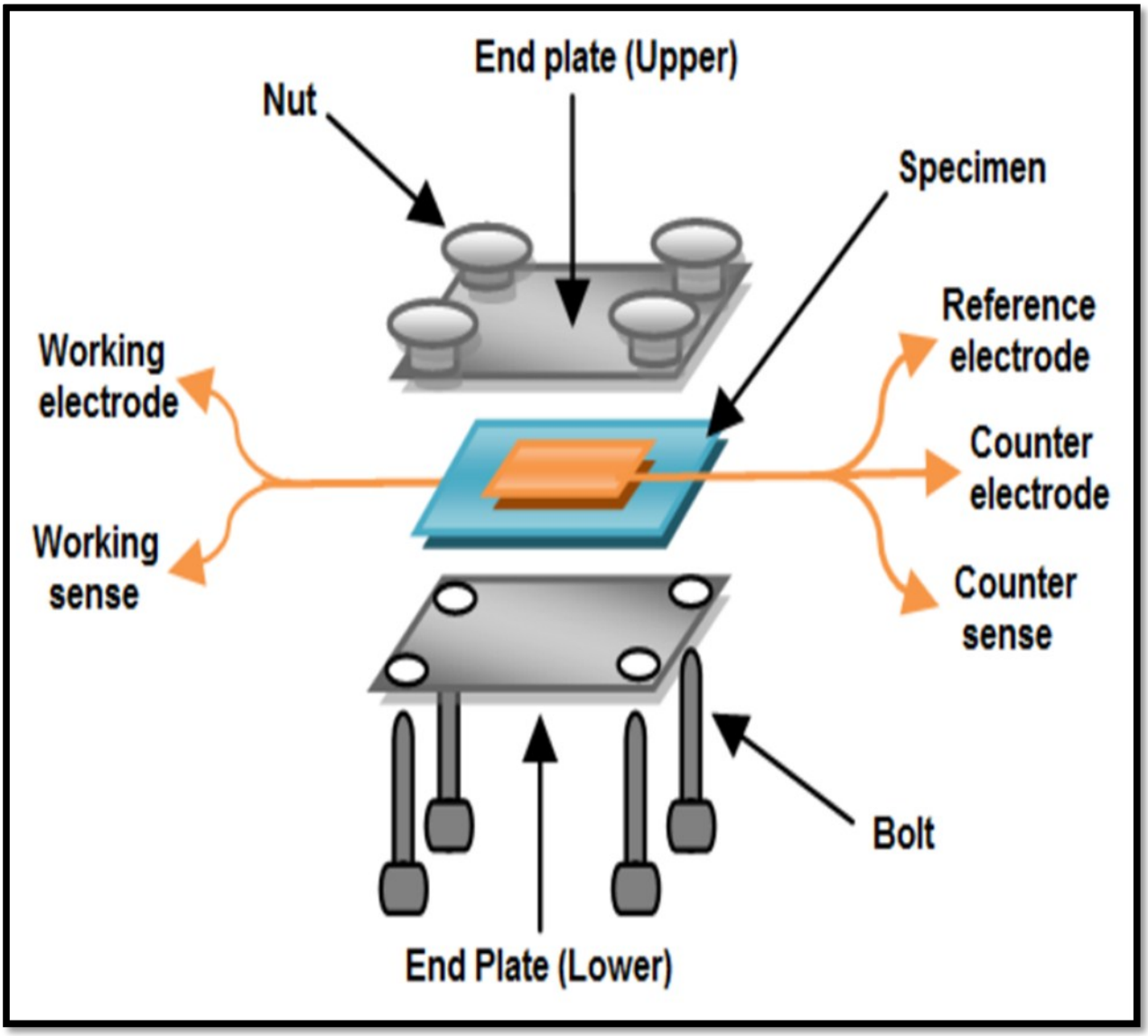


Fig S6. Membrane electrode assembly (MEA) in single chambered MFCs