



Supplementary Material

Complexes of Sodium Pectate with Nickel for Hydrogen Oxidation and Oxygen Reduction in Proton-Exchange Membrane Fuel Cells

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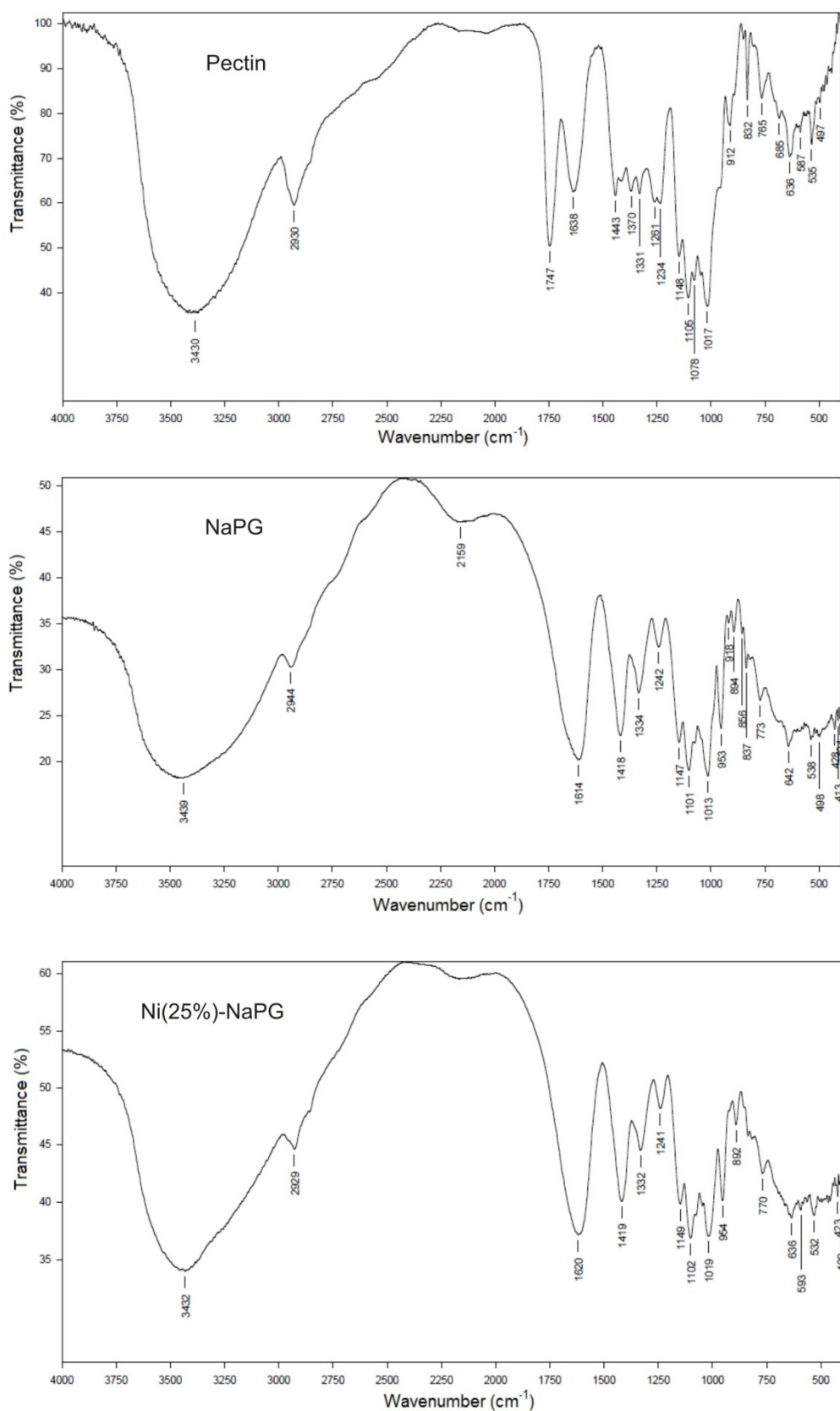


Figure S1. IR spectra of the pectin, sodium polygalacturonate (NaPG) and sodium polygalacturonate complex [Ni(25%)-NaPG] with 25% substitution of sodium with nickel.

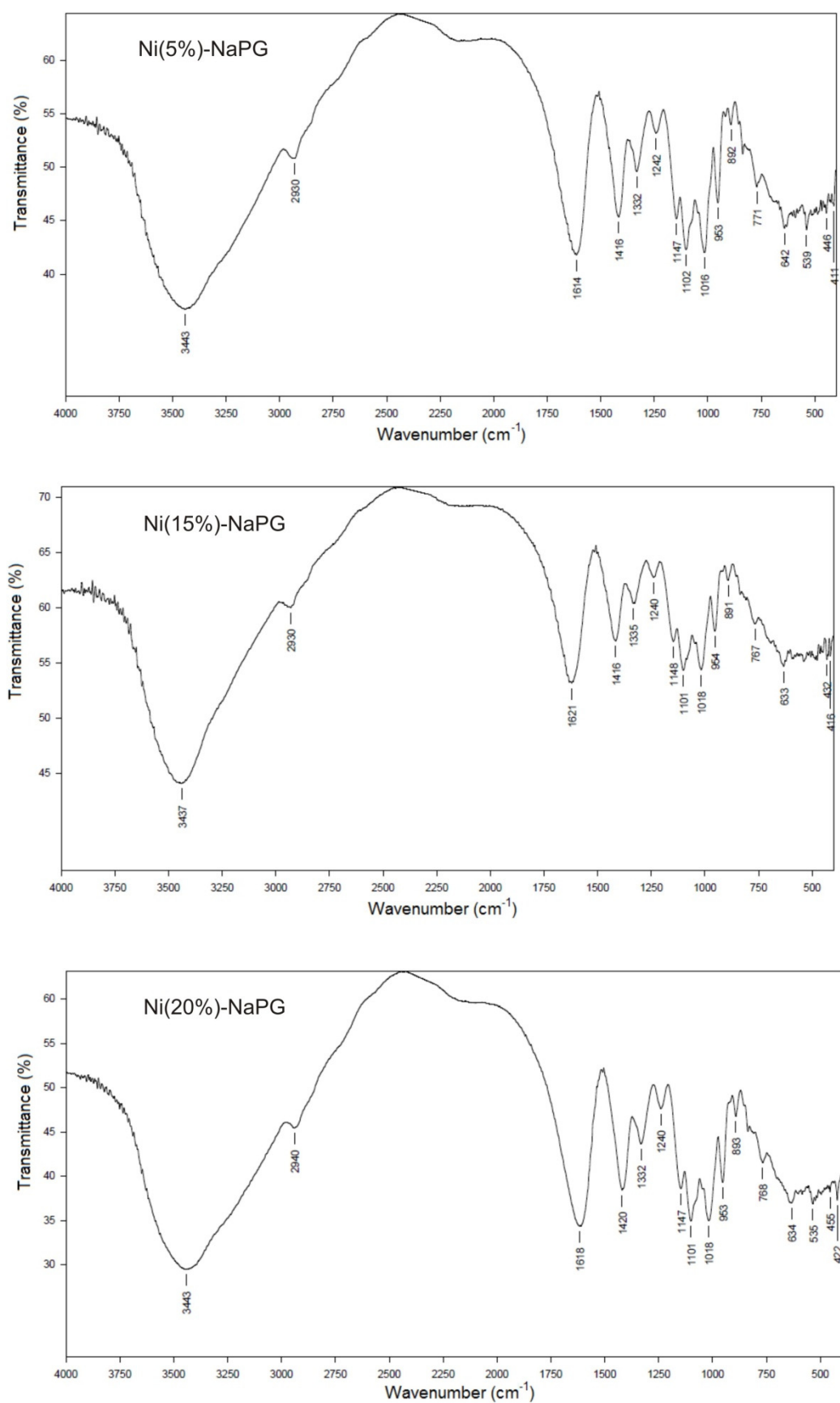


Figure S2. IR spectra of the sodium polygalacturonate complexes Ni(5%)-NaPG, Ni(15%)-NaPG, Ni(20%)-NaPG.

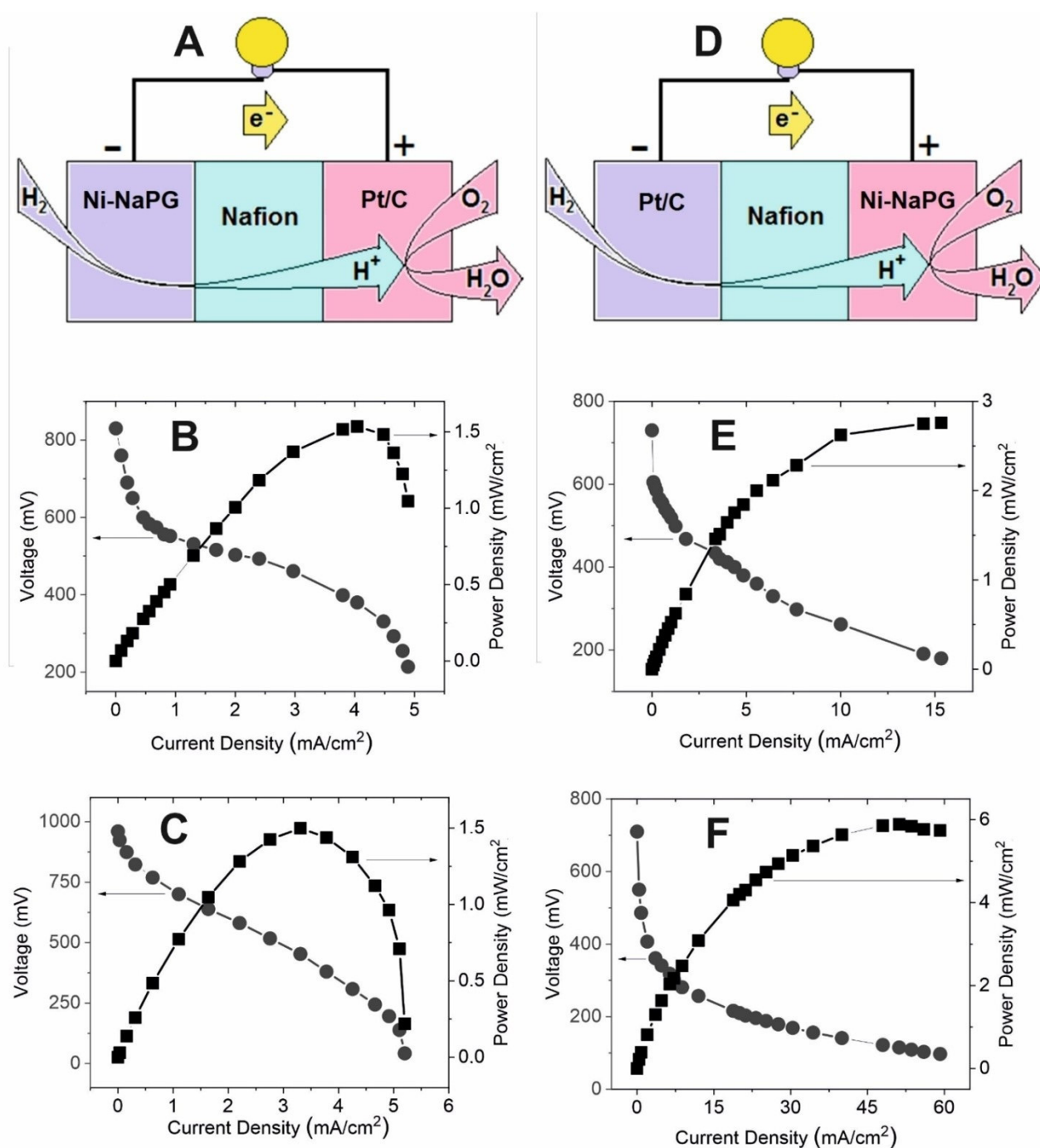


Figure S3. Representations (A, D) of the H_2/O_2 PEMFC and polarization and power curves at $80^\circ C$ for MEAs Ni(15%)-NaPG/Nf/Pt (B), Ni(25%)-NaPG/Nf/Pt^[a] (C), Pt/Nf/Ni(15%)-NaPG (E), Pt/Nf/Ni(25%)-NaPG^[b] (F).

^[a] From M.K. Kadirov, S.T. Minzanova, I.R. Nizameev, M.N. Khrizanforov, L.G. Mironova, K.V. Kholin, D.M. Kadirov, E.S. Nefed'ev, M.V. Morozov, A.T. Gubaidullin, Yu.H. Budnikova, O.G. Sinyashin, *ChemistrySelect*, 2019, 4, 4731-4734.

^[b] From Kadirov, M. K., Karasik, A. A., Nizameev, I. R., Strel'nik, I. D., Kholin, K. V., Kadirov, D. M., Ismaev, T.I., Budnikova, Y.H., Sinyashin, *Energy Technology*, 2018, 6(6), 1088-1095.

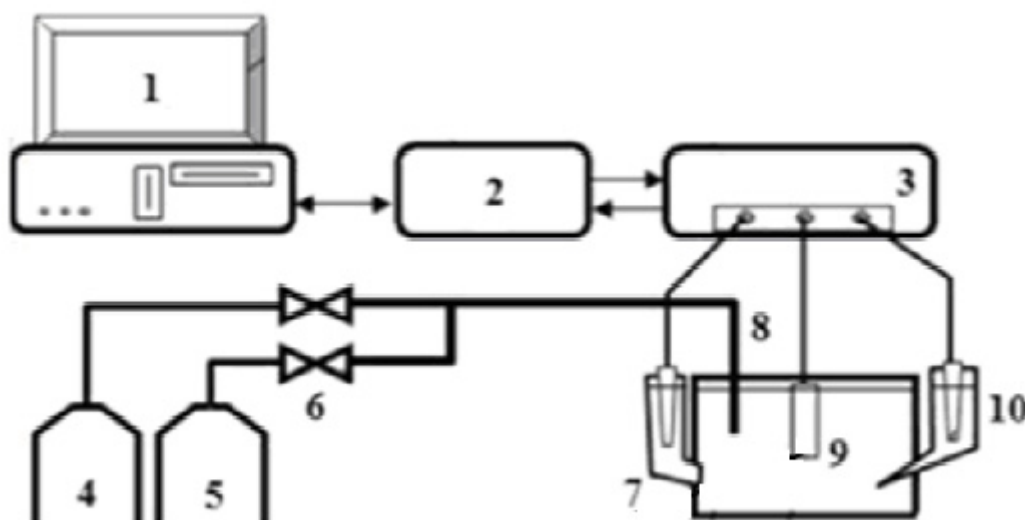


Figure S4. The scheme of electrochemical set-up. 1- computer, 2 – potentiostat Elins P-20x, 3 – rotating disc electrode – Basi RDE-2, 4 – vessel with inert gas (Ar), 5 – vessel with oxygen, 6 – valve of microadjusting, 7 – counter electrode, 8 – capillary for gas introducing, 9 – working electrode, 10 – reference electrode.

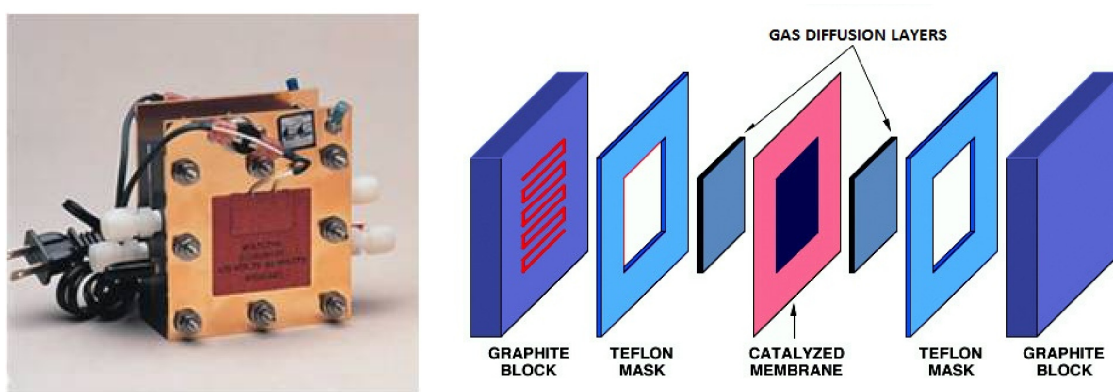


Figure S5. Scheme and appearance of the standard PEMFC used in the tests.