Supporting Information

Fulya Ekiz,[a] Funda Oğuzkaya,[b,e] Mehriban Akın,[c] Suna Timur,[c] Cihangir Tanyeli*[a,b] and Levent Toppare*[a, b,d]

[a] *Department of Biotechnology, Middle East Technical University, Ankara, Turkey. Fax: +903122103200; Tel: +903122103251; E-mail: toppare@metu.edu.tr*

[b] *Department of Chemistry, Middle East Technical University, Ankara, Turkey. Fax: +903122103200; Tel: +903122103222; E-mail: tanyeli@metu.edu.tr*

[c] *Department of Biochemistry, Faculty of Science, Ege University, Izmir, Turkey.*

[d] *Department of Polymer Science and Technology, Middle East Technical University, Ankara, Turkey.*

[e] *TÜBİTAK Marmara Research Center Energy Institute, Kocaeli, Turkey.*

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Synthesis

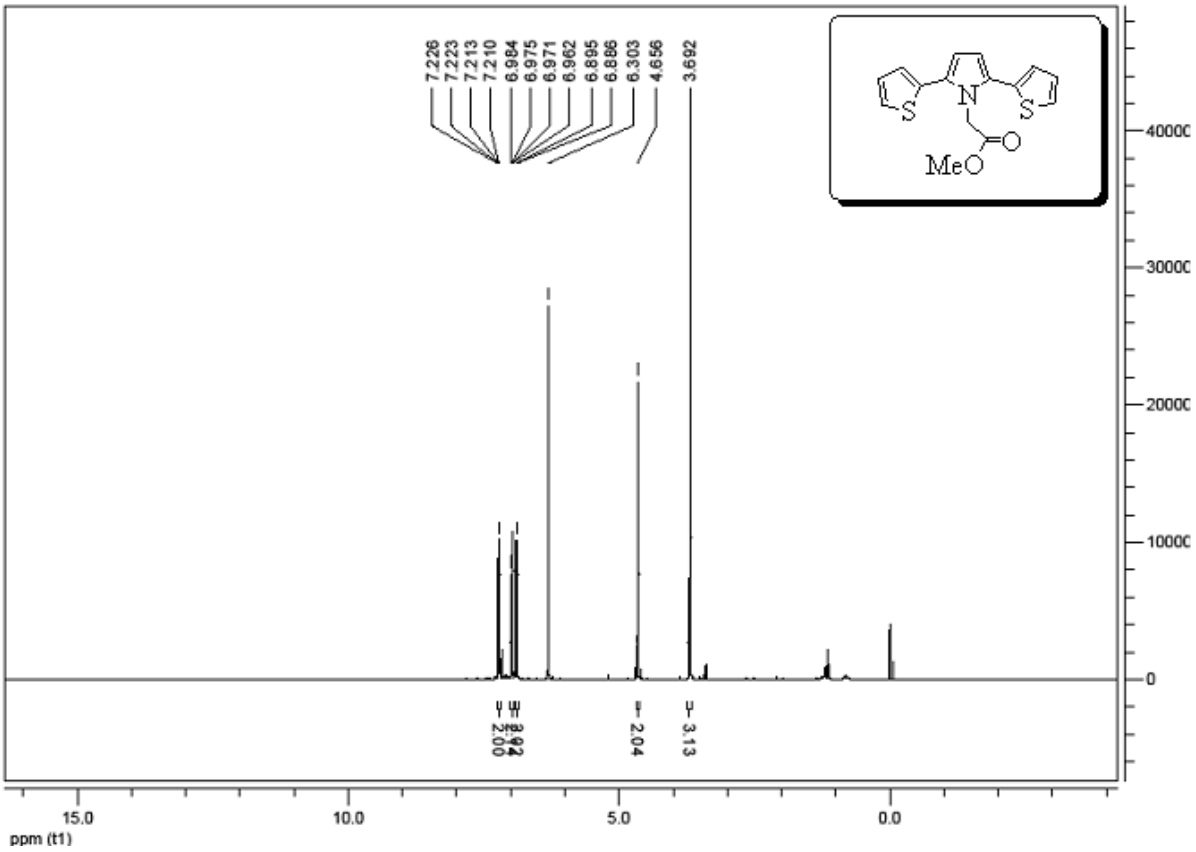
Flash column chromatography was performed using thick-walled glass columns with a flash grade silica gel (Merck Silica Gel 60). Reactions were monitored by thin layer chromatography using precoated silica gel plates (Merck Silica Gel PF-254), visualized by UV-light and polymolybdene phosphoric acid in ethanol. ^{1}H and ^{13}C NMR were recorded in $CDCl_3$ and the chemical shifts were expressed in ppm relative to $CDCl_3$ (δ 7.26 and 77.0 for ^{1}H and ^{13}C NMR, respectively) as the internal standard.

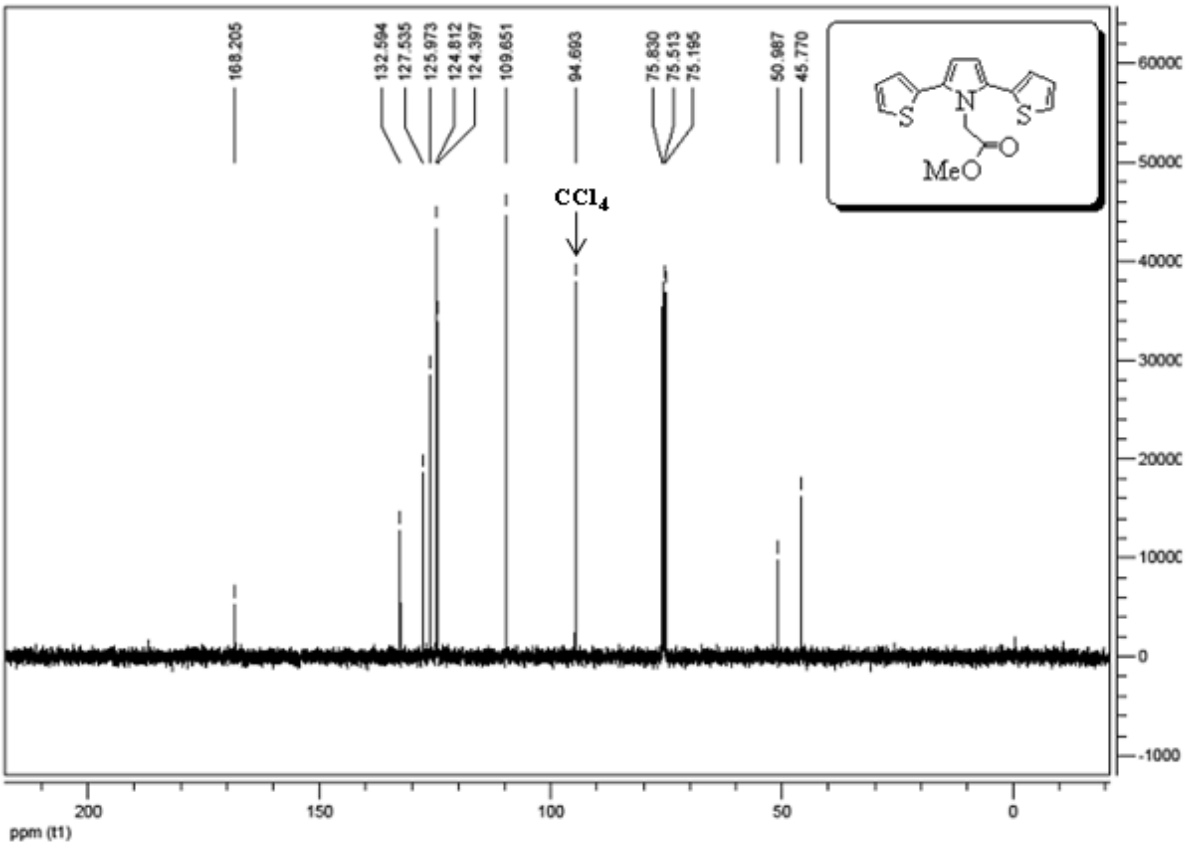
Characterization

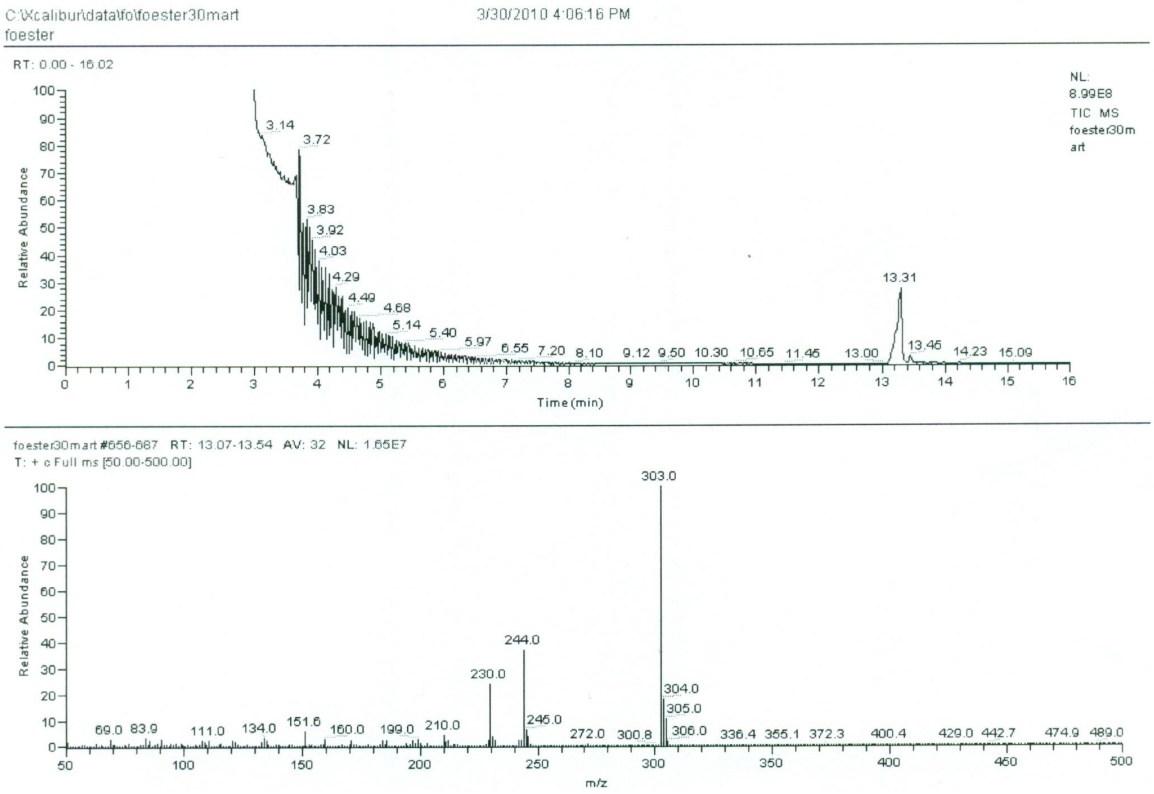
XPS (X-ray Photoelectron Spectroscopy) was carried out on a PHI 5000 Versa Probe (Φ ULVAC-PHI, Inc., Japan/USA) model X-ray photoelectron spectrometer instrument with monochromatized Al Kα radiation (1486.6 eV) as an X-ray anode at 24.9 W. The pressure inside the analyzer was maintained at 10^{-7} Pa. The binding energy scale was referenced by setting the C–H peak maximum in the C 1s spectrum to 285.0 eV and the atomic composition estimated using Multipak software.

^{1}H NMR, ^{13}C NMR, MS spectra for methyl 2-(2,5-di(thiophen-2-yl)-1*H*-pyrrol-1-yl)acetate

^{1}H-NMR ($CDCl_3$+CCl_4): δ 7.22 (dd, J=1.0 Hz, J=5.1 Hz, 2H), 6.97 (dd, J=3.5 Hz, J=5.2 Hz, 2H), 6.89 (dd, J=1.0 Hz, J=3.5 Hz, 2H), 6.30 (s, 2H), 4.66 (s, 2H), 3.69 (s, 3H). ^{13}C-NMR ($CDCl_3$+CCl_4): 168.2, 132.6, 127.5, 126.0, 124.8, 124.4, 109.6, 51.0, 45.8. MS (EI) m/z (relative intensity): 303.0 (100), 304.0 (18), 305.0 (10), 244.0 (37), 230.0 (22).

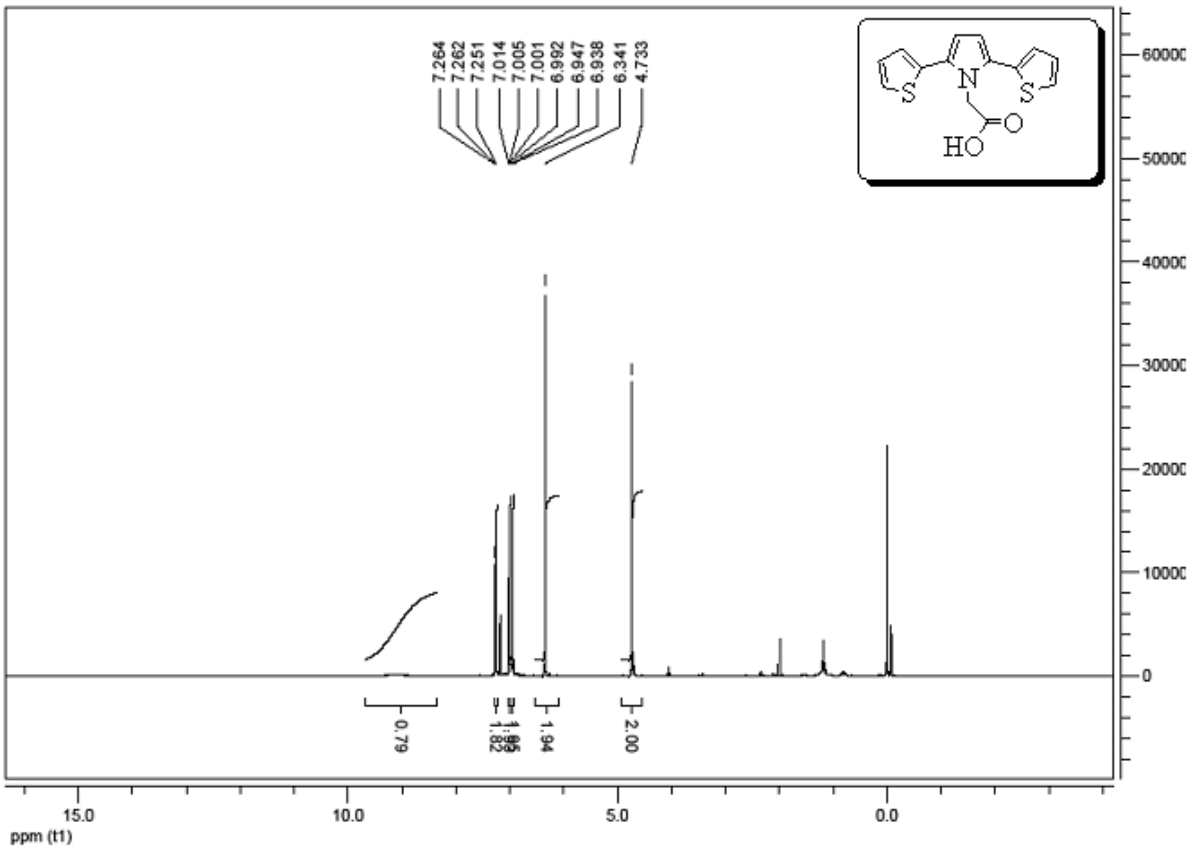


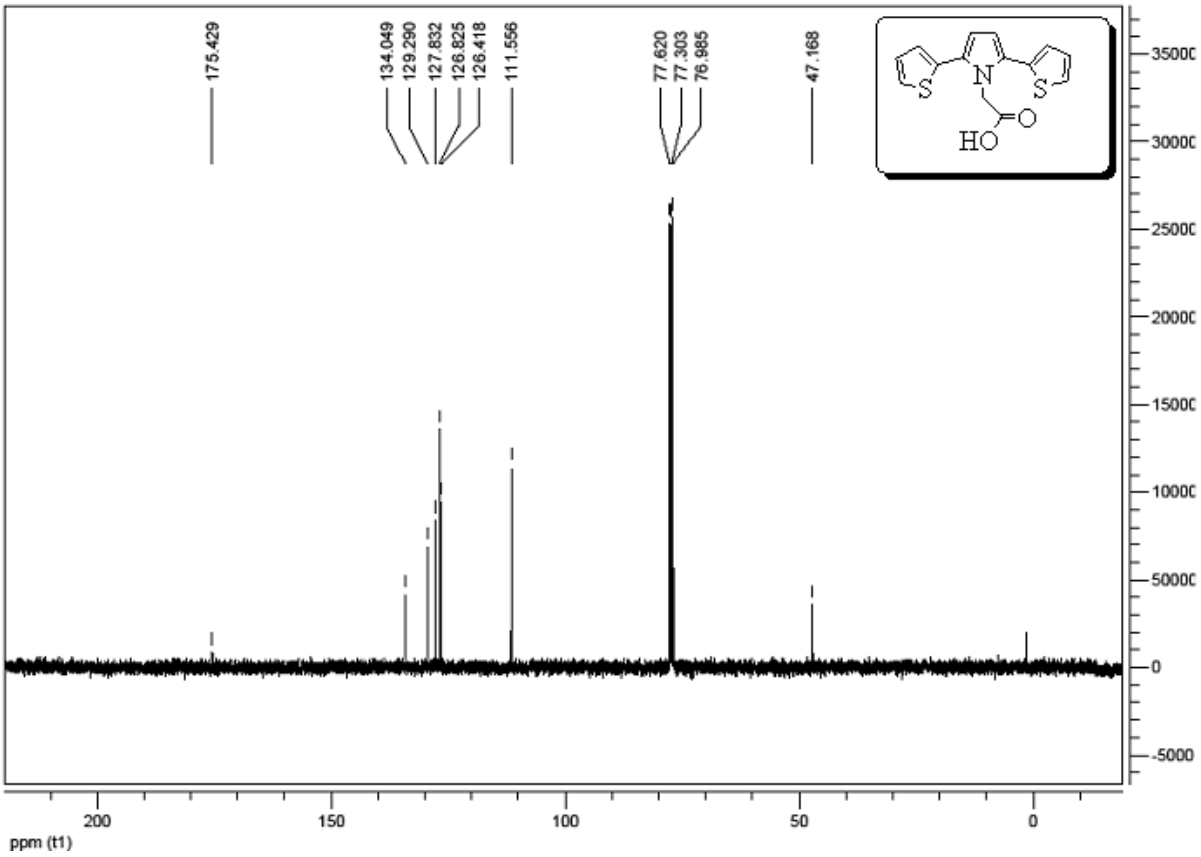


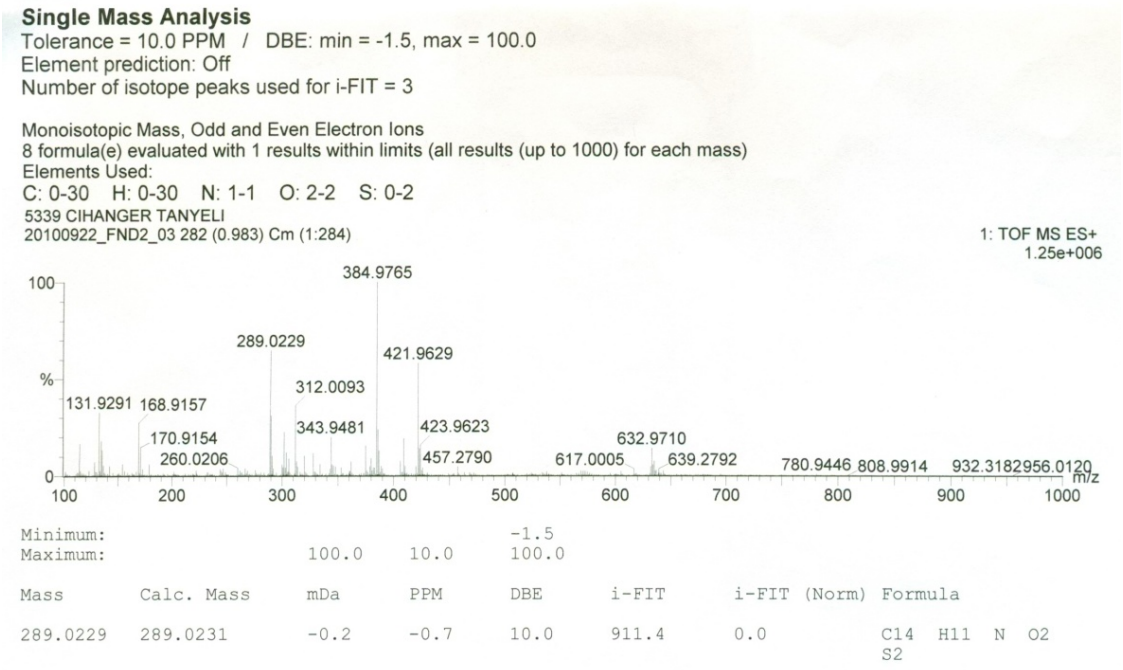


^{1}H NMR, ^{13}C NMR, HRMS spectra for 2-(2,5-di(thiophen-2-yl)-1*H*-pyrrol-1-yl)acetic acid

^{1}H-NMR ($CDCl_3$): δ 9.1 (s, 1H), 7.26 (dd, J=1.0 Hz, J=5.2 Hz, 2H), 7.00 (dd, J=3.6 Hz, J=5.1 Hz, 2H), 6.94 (dd, J=1.0 Hz, J=3.5 Hz, 2H), 6.34 (s, 2H), 4.73 (s, 2H). ^{13}C-NMR ($CDCl_3$): 175.4, 134.0, 129.3, 127.8, 126.8, 126.4, 111.6, 47.2. MS (EI) m/z (relative intensity): 289.0. HRMS: Calculated [M]+ 289.0231, Measured [M]+ 289.0229.







Sample Application

G. oxydans DSMZ 2343 was obtained from the German Collection of Microorganisms and Cell Cultures (Braunschweig, Germany) and was sub-cultured in a medium containing (in g/L): glucose, 100; yeast extract, 10; calcium carbonate, 20; agar, 20. Cells were cultivated in shake flasks on a shaker (175 rpm) at 28 °C, in a medium containing (in g/L): yeast extract, 5; carbon source: glucose, 5.[1] For sample application, 1 mL of cultivation medium was collected hourly for 5 hours. After centrifugation of the fermentation medium, the samples were applied to the biosensor and the glucose content of the samples was calculated in reference to HPLC method.

HPLC with a refractive index detector (RID) controlled by a HP-Chemstation (Agilent, Karlsruhe, Germany) was used as the reference method for independent analysis of the glucose content. HPLC column (GL Sciences Inc. Inertsil NH_2 5.0 µm (4.6 I.D x 250 mm), Japan) was used for the chromatographic separation at 30 °C. Injection volume was 20 µL.

The mobile phase was H_2SO_4 (5 mM).[2] The flow rate was 0.6 mL/min. Initially a standard calibration curve for glucose was plotted (0.1-50 mM for glucose with the equation of

y=303971.24x; R^2=0.999). After dilution with the mobile phase and a centrifugation step the samples were applied to the column and then glucose concentrations were calculated using the calibration plot.

1 J. Tkac, I. Vostiar, L. Gorton, P. Gemeiner and E. Sturdik, *Biosens. Bioelectron.* 2003, **18**, 1125-1134.

2 A. Plaga, J. Stumpfel and H. P. Fiedler, A*ppl. Microbiol. Biot.,* 1989, **32**, 45-49.