Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Early Diagnosis of Autoimmune Diseases through Electrochemical Biosensing using Modified Plastic Chip Electrode

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Fig. [illegible] ^{2}.

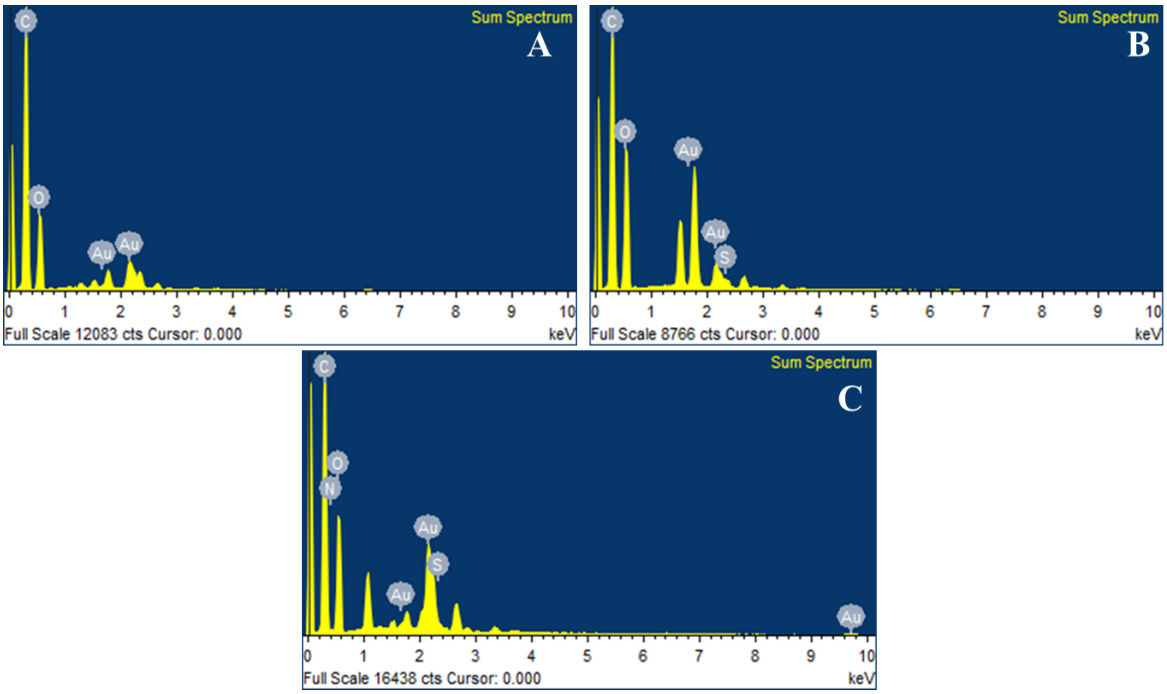

Figure S 2. EDX spectra of Au@PCE (A); MBA/Au@PCE (B); AB/MBA/Au@PCE (C)

Tabel S 1 Quantitative composition of working platform using EDX analysis

Electrode Platform	Carbon %	Oxygen %	Gold %	Sulphur %	Nitrogen %
Au@PCE	59.68	33.09	7.23		
MBA/Au@PCE	51.34	40.87.	6.88	0.91	
AB/MBA/Au@PCE	48.36	31.22	17.58	0.47	2.38

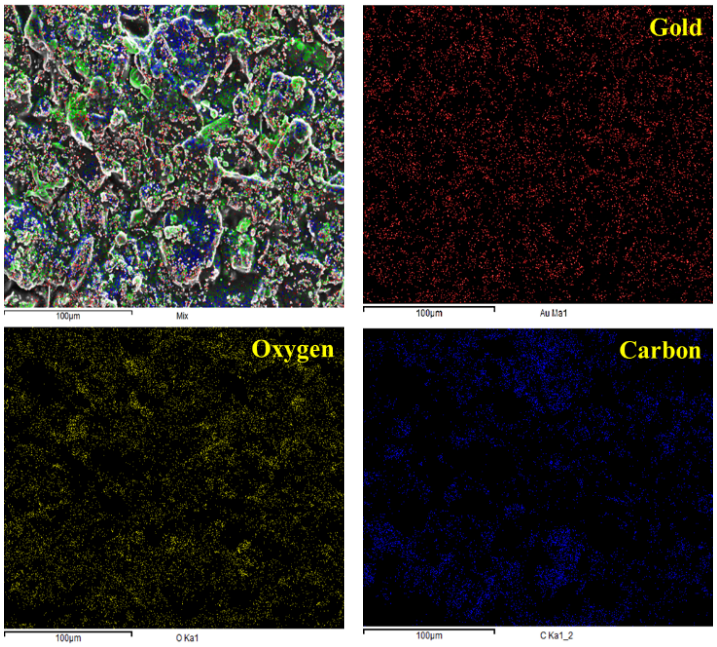

Figure S 3. EDX mapping image of Au@PCE.

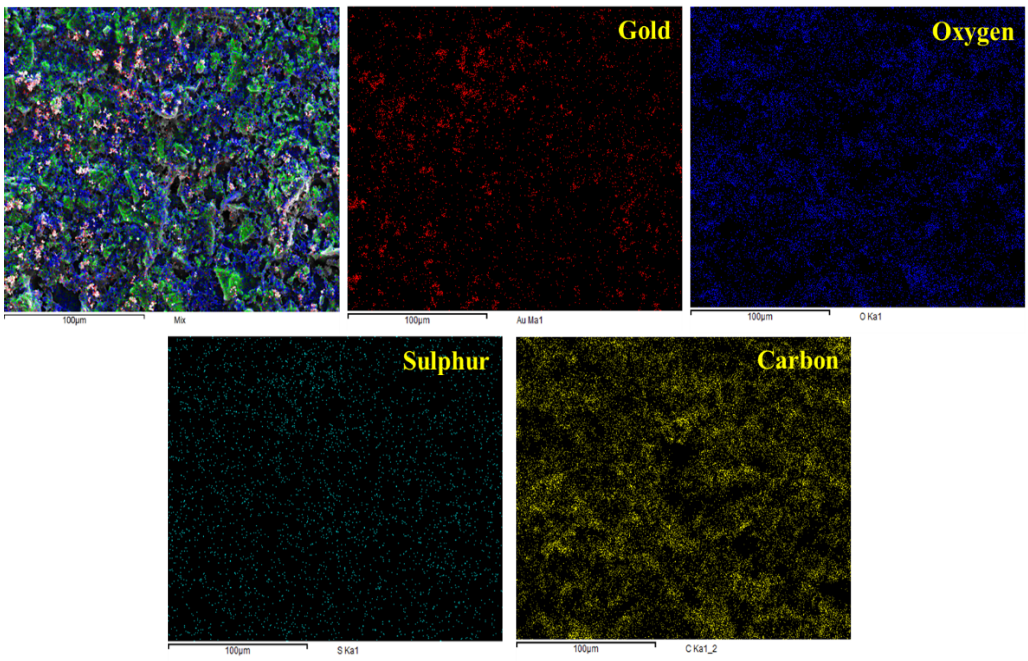

Figure S 4. EDX mapping image of MBA/Au@PCE.

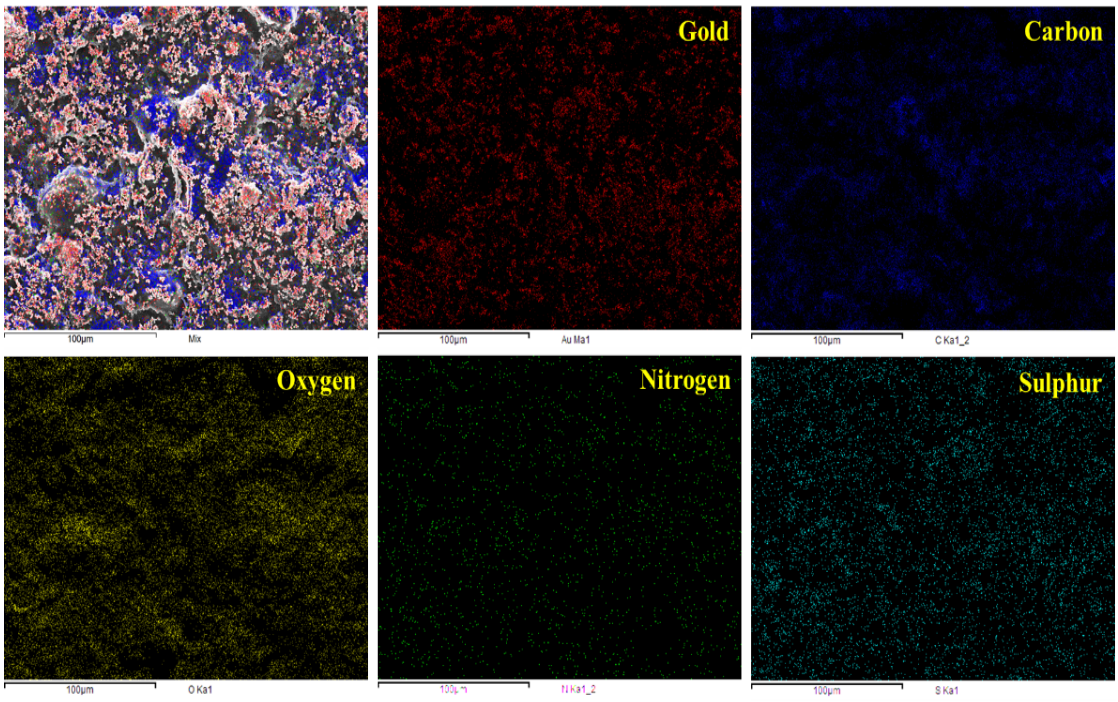

Figure S 5. EDX mapping image of AB/MBA/Au@PCE.

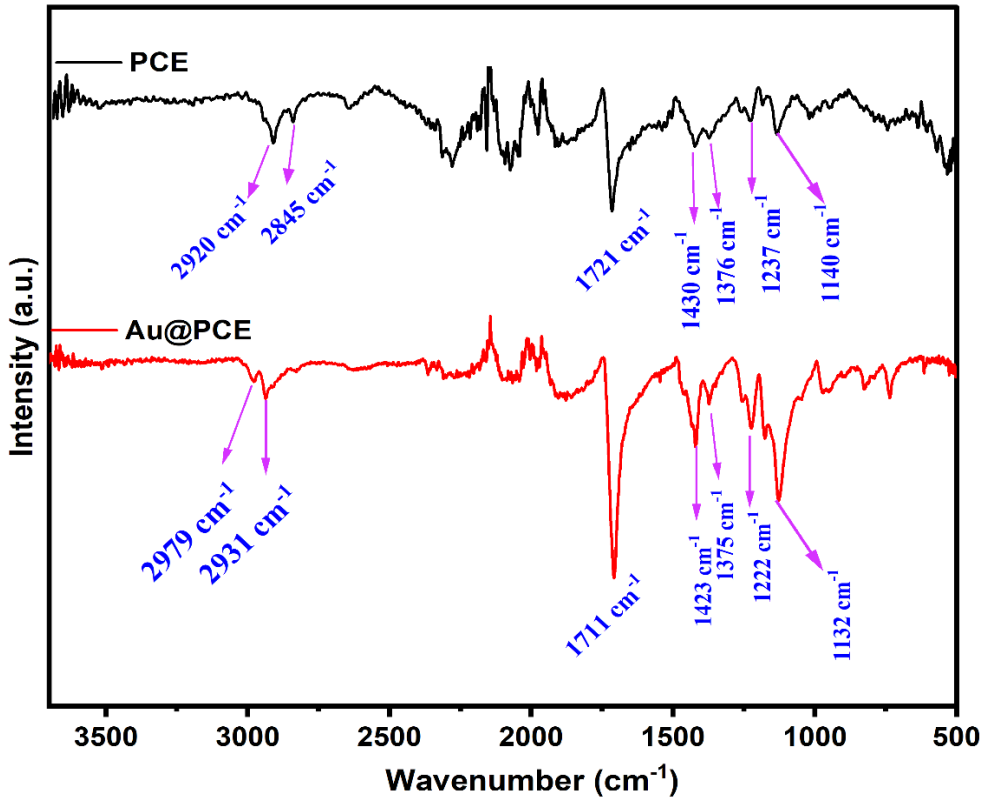

Figure S 6. FT-IR spectra of PCE and Au@PCE

Table S 2 Comparison of Sensors for the chemokine detection reported in the literature

Sl No.	Platform	Method	LOD	Dynamic range	Target analyte	References
1.	IP 10 antibodies/ nanofilm ZnO/ Au electrode	Non faradic EIS	Not available	1-2000 pg/mL	CXCL10	1
2.	Thiol gold bounded DNA anchor strand/ Au disk electrode	Square wave voltametry	60 pM	1-2000 nM	CXCL10	2
3.	3,3'-dithiobis (sulfosuccinimidylpropionate) /IP-10 antibody/ ZnO	Non-faradic EIS	1 pg/mL	1-512 pg/mL	CXCL10	3
4.	DNA barcode- streptavidin	Flurosense	14 pg/mL	0-4000 pg/mL	CXCL9	4
5.	Magnetic nanoparticles/ gold nanoparticles/screen printed electrode	Chronoamperometry	65 pg/mL	0-10000 pg/mL	CXCL9	5
6.	2,2':5',2''-terthiophene-3' (p-benzoic acid) /Aunps/glassy carbon electrode	Chronoamperometry	0.078 ng/mL	0.1-10 ng/mL	CXCL5	6
7.	6-phosphonohexanoic acid/ ITO	EIS	6 fg/mL	0.02-3 pg/mL	CXCL8	7
8.	3-(triethoxysilyl)propylisocyanate/fluorine tin oxide	EIS	11.9 fg/mL	0.02-4 pg/mL	CXCL8	8
9.	Carboxylated magnetic microparticles/screen printed carbon electrode	Amperometry	0.8 ng/mL	1-75 ng/mL	CXCL7	9
10.	CXCL-10 antibody/MBA/ Au@PCE	EIS	0.72 pg/mL	1 pg/mL - 50 ng/mL		This work

1. A. S. Tanak, S. Muthukumar, S. Krishnan, K. L. Schully, D. V. Clark and S. Prasad, *Biosens Bioelectron*, 2021, **171**, 112726.
2. A. J. Bonham, N. G. Paden, F. Ricci and K. W. Plaxco, *Analyst*, 2013, **138**, 5580-5583.
3. B. Jagannath, M. Pali, K.-C. Lin, D. Sankhala, P. Naraghi, S. Muthukumar and S. Prasad, *Advanced Materials Technologies*, 2022, **7**, 2101356.
4. I. Lee, S.-J. Kwon, M. Sorci, P. S. Heeger and J. S. Dordick, *Analytical Chemistry*, 2021, **93**, 16528-16534.
5. K. L. Singampalli, C. Neal – Harris, C. Yee, J. S. Lin and P. B. Lillehoj, *Advanced Sensor Research*, 2024, **n/a**, 2400004.
6. S. Chung, P. Chandra, J. P. Koo and Y.-B. Shim, *Biosensors and Bioelectronics*, 2018, **100**, 396-403.
7. E. B. Aydın and M. K. Sezgintürk, *Analytical Biochemistry*, 2018, **554**, 44-52.
8. E. B. Aydın and M. K. Sezgintürk, *Electroanalysis*, 2021, **33**, 1596-1605.
9. S. Guerrero, E. Sánchez-Tirado, L. Agüí, A. González-Cortés, P. Yáñez-Sedeño and J. M. Pingarrón, *Talanta*, 2021, **234**, 122705.