Supplementary Information

An electrochemical sensor based on Co_3O_4-ERGO nanocomposite modified screen-printed electrode for detection of uric acid in artificial saliva

Gizem Turkkan[a], Salih Zeki Bas[a]*, Keziban Atacan[b], Mustafa Ozmen[a]*

[a] Department of Chemistry, Selcuk University, 42250, Konya, Turkey.
*Corresponding authors: musozmen@gmail.com (M. Ozmen), salihzekibas@gmail.com (S.Z. Bas)
[b] Biomedical, Magnetic and Semiconductor Materials Application and Research Center (BIMAS-RC), Sakarya University, 54187, Sakarya, Turkey.
†Electronic supplementary information (ESI) available: Chemicals and Apparatus, FTIR analysis, Raman Analysis, Contact angle measurements.

Chemicals and Apparatus

Graphite powder (extra pure), hydrogen peroxide solution (30%, extra pure), $MgCl_2$, NaCl, cobalt nitrate hegzahydrate, NaOH, KCl, LiCl, lactic acid and ammonia solution were obtained Merck (Germany). $CaCl_2$ (99%) from Riedel, uric acid (UA, 99%) from Alfa Aesar (USA), ascorbic acid (AA) from J. T. Baker (USA), D-(+)-glucose from Sigma-Aldrich (USA) were purchased. Phosphate buffer solution (0.1 M, pH 7.4) was prepared from Na_2HPO_4 (from Sigma) and NaH_2PO_4 (from Sigma, USA). Ultrapure water was obtained from a Millipore water purification system (MilliQ, R = 18.2 MΩ at 25 °C, S.A., Molsheim, France) and used in the preparation of all aqueous solutions.

All electrochemical measurements were conducted using a CHI660C electrochemical workstation (CH Instrument Co., China) by means of a screen-printed electrode (SPE) (DRP150, Metrohm DropSens, Spain) consisting of carbon (4 mm diameter) as the working electrode, platinum as the counter and silver as the reference electrode. The Fourier Transform Infrared Spectroscopy (FTIR) was used for the structural characterization *via* a Bruker Fourier Transform Infrared FTIR (ATR, USA). The synthesized Co_3O_4 NPs were characterized by Bruker D8 XRD instrument as powder form. Raman spectra were recorded with a Renishaw inVia model spectrometer. Surface morphology and elemental composition of the synthesized Co_3O_4 NPs were investigated by Zeiss-Evo SEM with Bruker EDAX part. The morphology of electrodes was also characterized by a Zeiss Gemini SEM 500 FE-SEM instrument (Germany). The surface morphology of electrodes were characterized using a Solver Pro AFM from NT-MDT (Russia). Tapping mode of AFM in air was used to investigate the surface morphology of electrodes. Surface wettability measurements of the obtained electrodes were performed by measuring the contact angle of 3 µL sessile water droplets on their surface using KSV CAM 200 (Finland) goniometer.

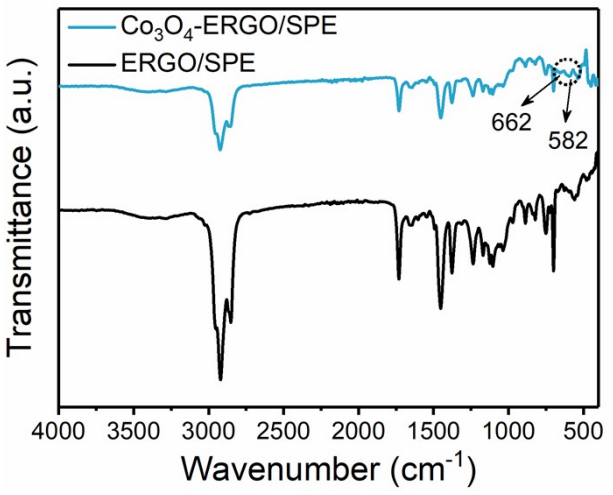

Fig. S1 FTIR spectrum of ERGO/SPE and Co_3O_4-ERGO/SPE surfaces.

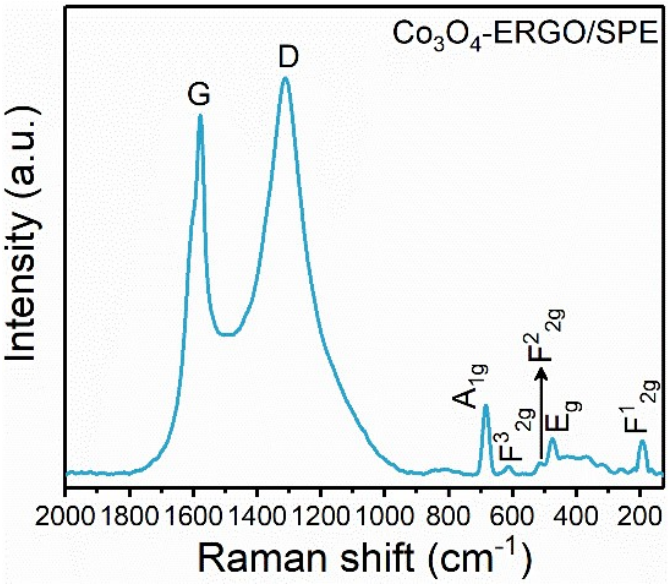

Fig. S2 Raman spectrum of Co_3O_4-ERGO/SPE surface.

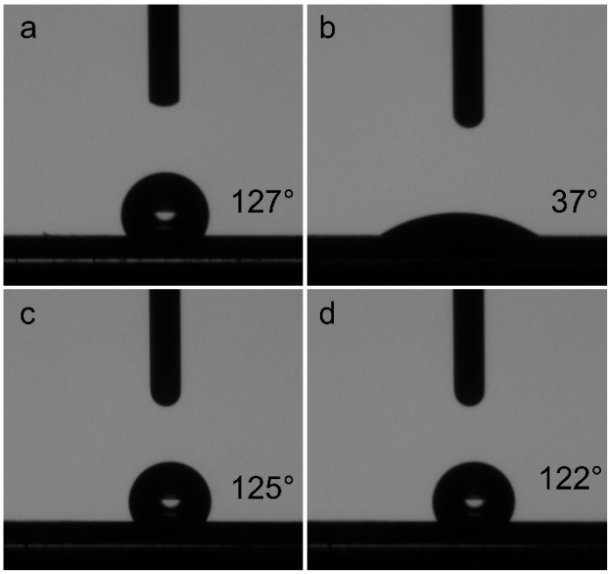

Fig. S3 Water contact angle measurements of bare SPE, GO/SPE, ERGO/SPE and Co_3O_4-ERGO/SPE surfaces.