

**Electrochemical determination of metformin via carbon paste electrode
modified with Ag NPs/Cu₂O/CuO-decorated bacterial nanocellulose
composite**

S. Zamani¹, Kh. Ghanbari*¹, S. Bonyadi¹

*¹Department of Analytical Chemistry, Faculty of Chemistry, Alzahra University, P. O. Box 1993893973,
Tehran, Iran.*

*Corresponding author. Tel.: +98 21 88044040; fax: +98 21 88035187.
E-mail address: kh.ghanbari@alzahra.ac.ir (kh_ghanb@yahoo.com).

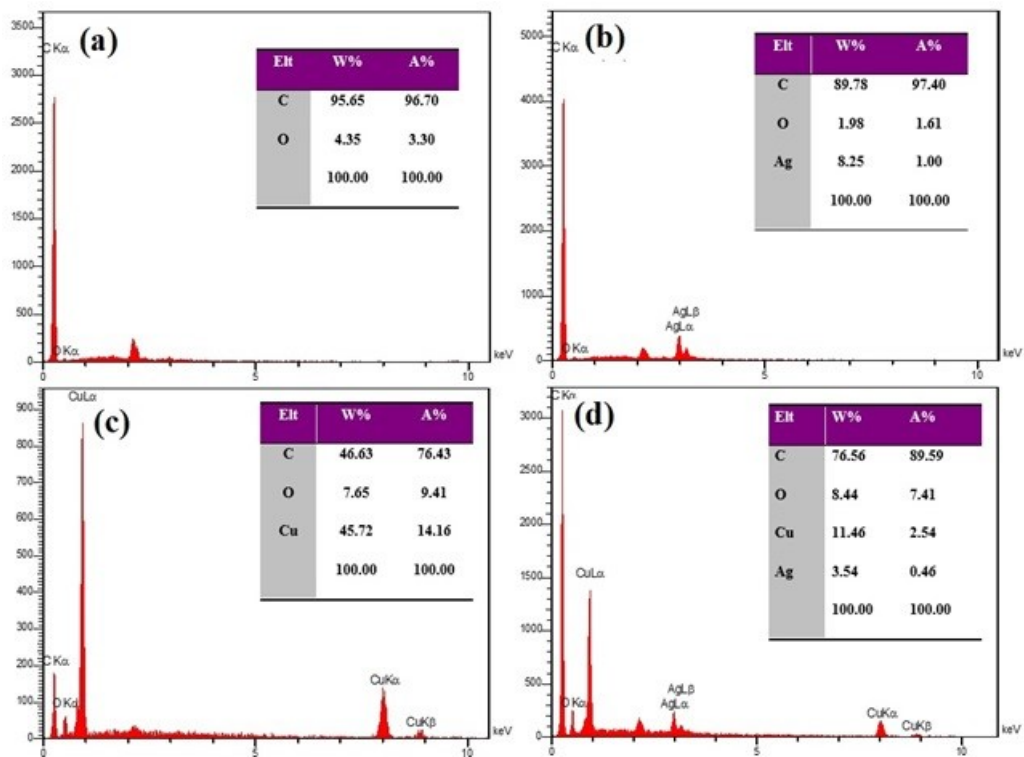


Fig. S1 EDX spectrum of (a) BNC, (b) Ag NPs/BNC, (c) Cu₂O/CuO/BNC, and (d) Ag NPs/Cu₂O/CuO/BNC nanocomposite.

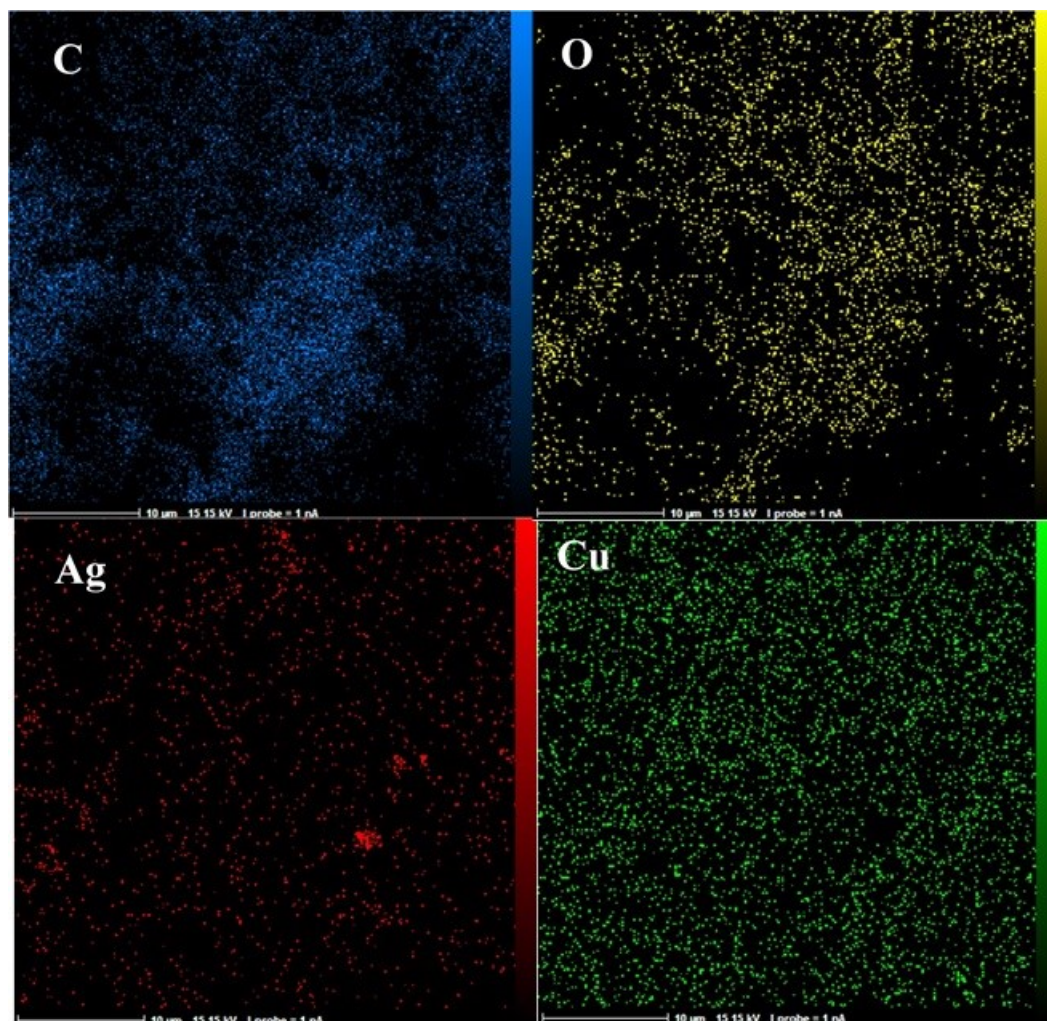


Fig. S2 Elemental mapping images of Ag NPs/Cu₂O/CuO/BNC nanocomposite.

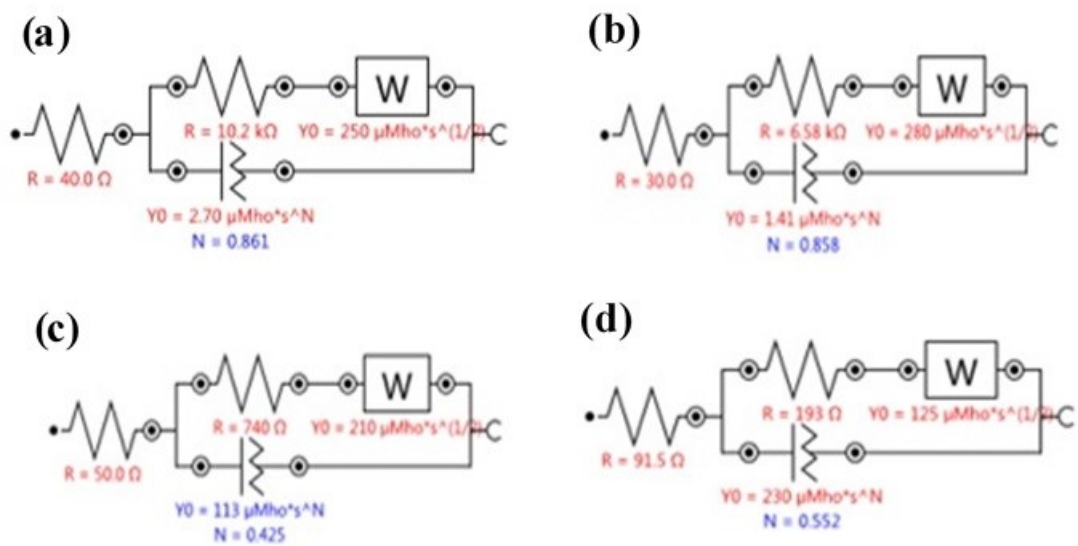


Fig. S3. Equivalent circuits of (a) BNC, (b) $\text{Cu}_2\text{O}/\text{CuO}/\text{BNC}$, (c) Ag NPs/BNC, and (d) Ag NPs/ $\text{Cu}_2\text{O}/\text{CuO}/\text{BNC}$ nanocomposite.

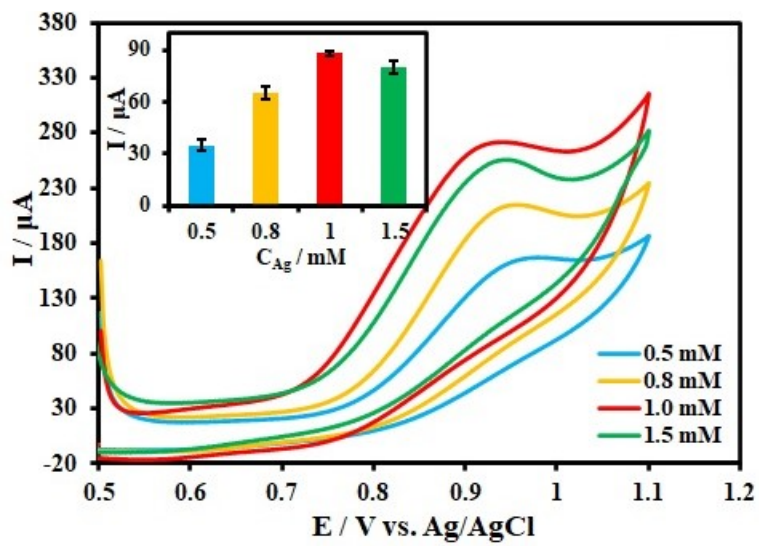


Fig. S4. Optimization of the quantity of AgNO₃ required for deposition of Ag NPs.

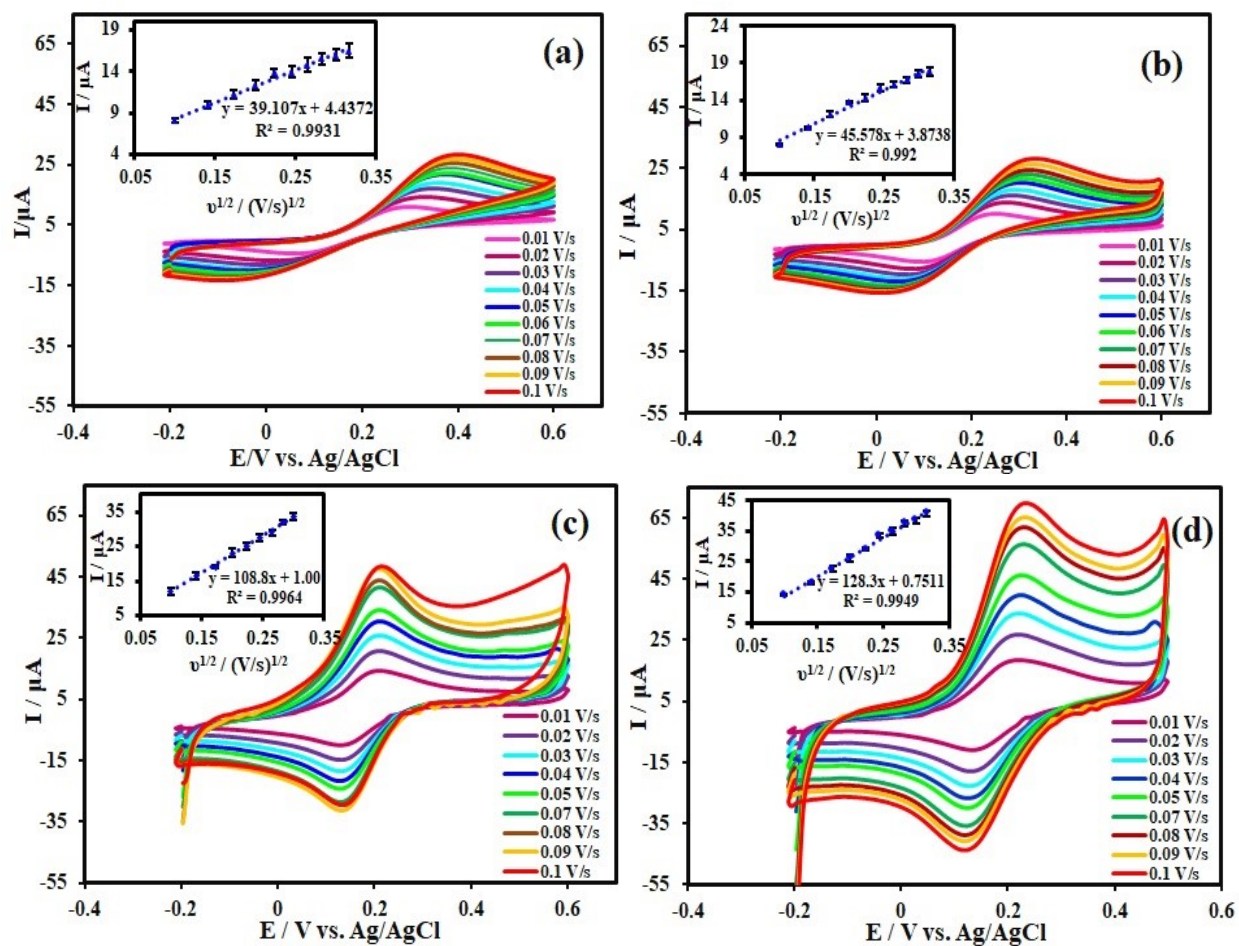


Fig. S5 Cyclic voltammograms of (a) CPE, (b) BNC/CPE, (c) $\text{Cu}_2\text{O}/\text{CuO}/\text{BNC}/\text{CPE}$, and (d) Ag NPs/ $\text{Cu}_2\text{O}/\text{CuO}/\text{BNC}/\text{CPE}$ electrodes in a solution containing 1 mM $\text{K}_3[\text{Fe}(\text{CN})_6]/\text{K}_4[\text{Fe}(\text{CN})_6]$ in 0.1 M KCl at various scan rates (10-100 mV s^{-1}). Inset a plot of I_p vs. $v^{1/2}$.

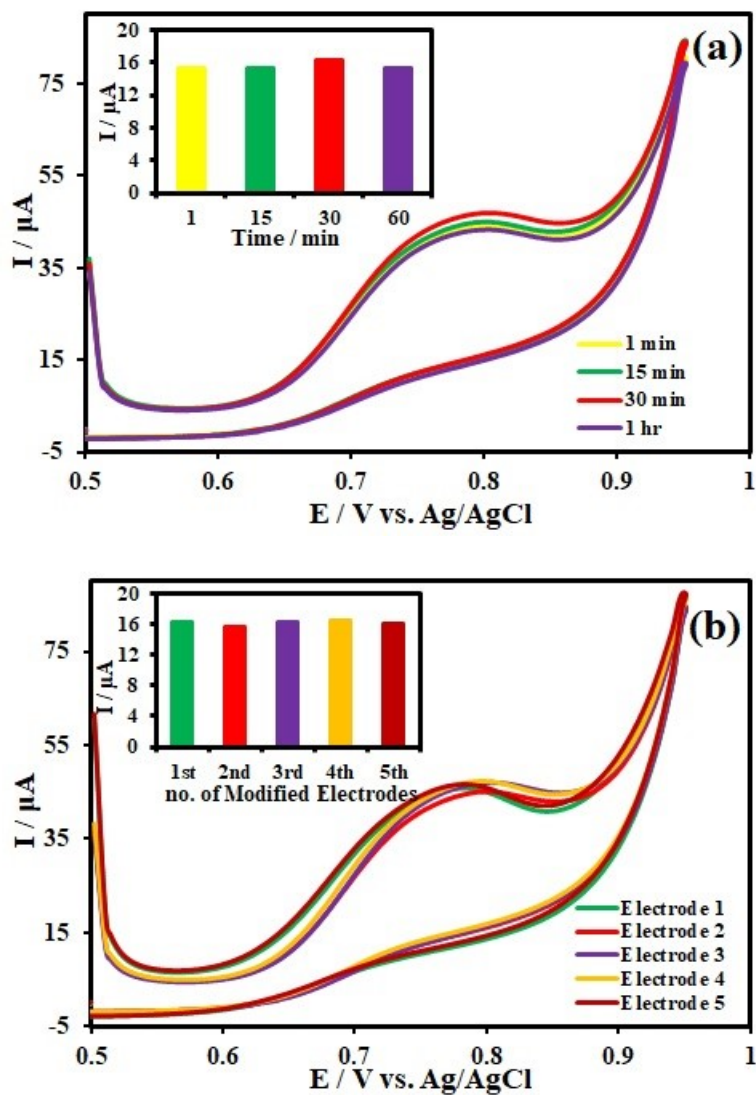


Fig. S6 CVs of Ag NPs/Cu₂O/CuO/BNC/CPE in 0.5 mM MET (in 0.04 M BR solution, pH=10.0) in order to investigate: (a) repeatability and (b) reproducibility; the plot of current vs. time; the plot of current vs. number of the electrode.