

A Novel Synthesis of Inorganic-Organic Nanohybrid Based on SiW₁₁Co@Cu-BTC/MWCNTs-COOH for Electrocatalytic Oxidation of Dopamine

Zahra Sadeghi, Somayeh Dianat*

Department of Chemistry, Faculty of Sciences, University of Hormozgan, Bandar Abbas 79161-93145, Iran

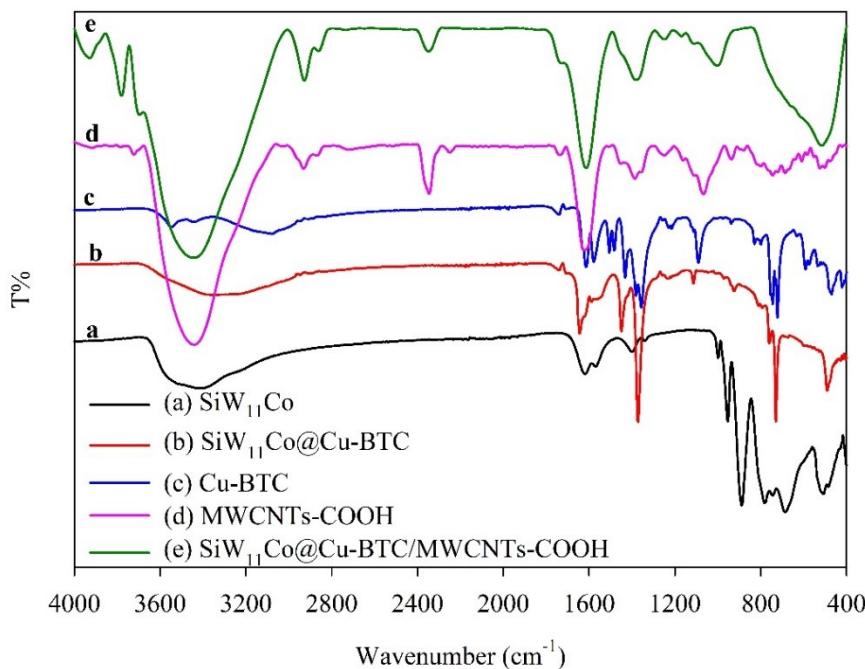


Figure S1. FT-IR spectra of SiW₁₁Co (a), SiW₁₁Co@Cu-BTC (b), Cu-BTC (c), MWCNTs-COOH (d), and SiW₁₁Co@Cu-BTC/MWCNTs-COOH (e)

Table S1. Stretching frequencies ($\bar{\nu}$ /cm⁻¹) in FT-IR spectra and their assignments for synthesized compounds

Compound	$\bar{\nu}(\text{OH})$	$\bar{\nu}(\text{COOH})$	$\bar{\nu}(\text{C=C})$	$\bar{\nu}(\text{C=O})$	$\bar{\nu}(\text{C-O})$	$\bar{\nu}(\text{Si-O}_\text{a})$	$\bar{\nu}(\text{W-O}_\text{d})$	$\bar{\nu}(\text{W-O}_\text{b-W})$	$\bar{\nu}(\text{W-O}_\text{c-W})$	$\bar{\nu}(\text{Cu-O})$
SiW ₁₁ Co	-	-	-	-	-	1006	956	891	689	-
SiW ₁₁ Co@Cu-BTC	-	-	-	1650	1379	930	766	732	492	732
Cu-BTC	-	-	-	1620	1353	-	-	-	-	724
MWCNTs-COOH	3444	1741	1619	-	-	-	-	-	-	-
SiW ₁₁ Co@Cu-BTC/MWCNTs-COOH	3452	1733	1615	1615	1386	1010	-	-	-	522

O_a Central oxygen

O_b, O_c Bridging oxygen

O_d Terminal oxygen

*Corresponding author:

Tel.: +98 76 33670121, Email Address: s.dianat@hormozgan.ac.ir

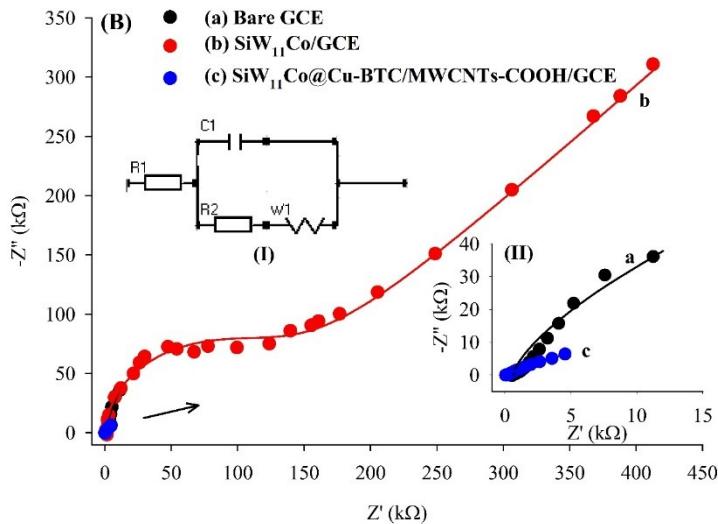
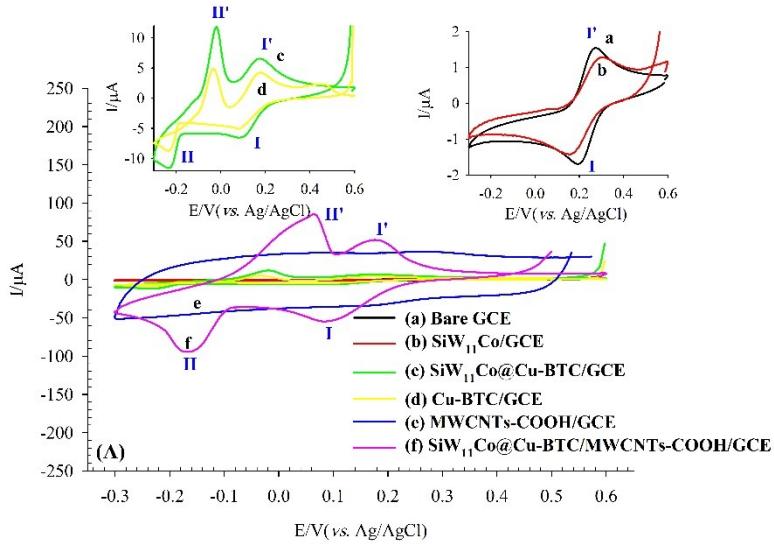


Figure S2. (A) CVs obtained in the presence of 0.5 mM $[\text{Fe}(\text{CN})_6]^{3-/4-}$, in 0.01 M PBS (pH 3) containing 0.1 M KCl on the bare GCE and different modified GCEs; Scan rate: 50 mV s⁻¹. (B) Nyquist plots of the bare GCE (a), SiW₁₁Co/GCE (b), and SiW₁₁Co@Cu-BTC/MWCNTs-COOH/GCE (c) in the presence of 0.5 mM $[\text{Fe}(\text{CN})_6]^{3-/4-}$, in 0.01 M PBS (pH 3) containing KCl (0.1 M); Applied potential of + 0.13 V, AC amplitude of 5 mV, and frequency range of 0.01-10⁵ Hz. Lines show equivalent circuit fitting. Inset (I) shows an electrical equivalent circuit used to fit the spectra. Inset (II) is the magnified plots of (a), and (c).

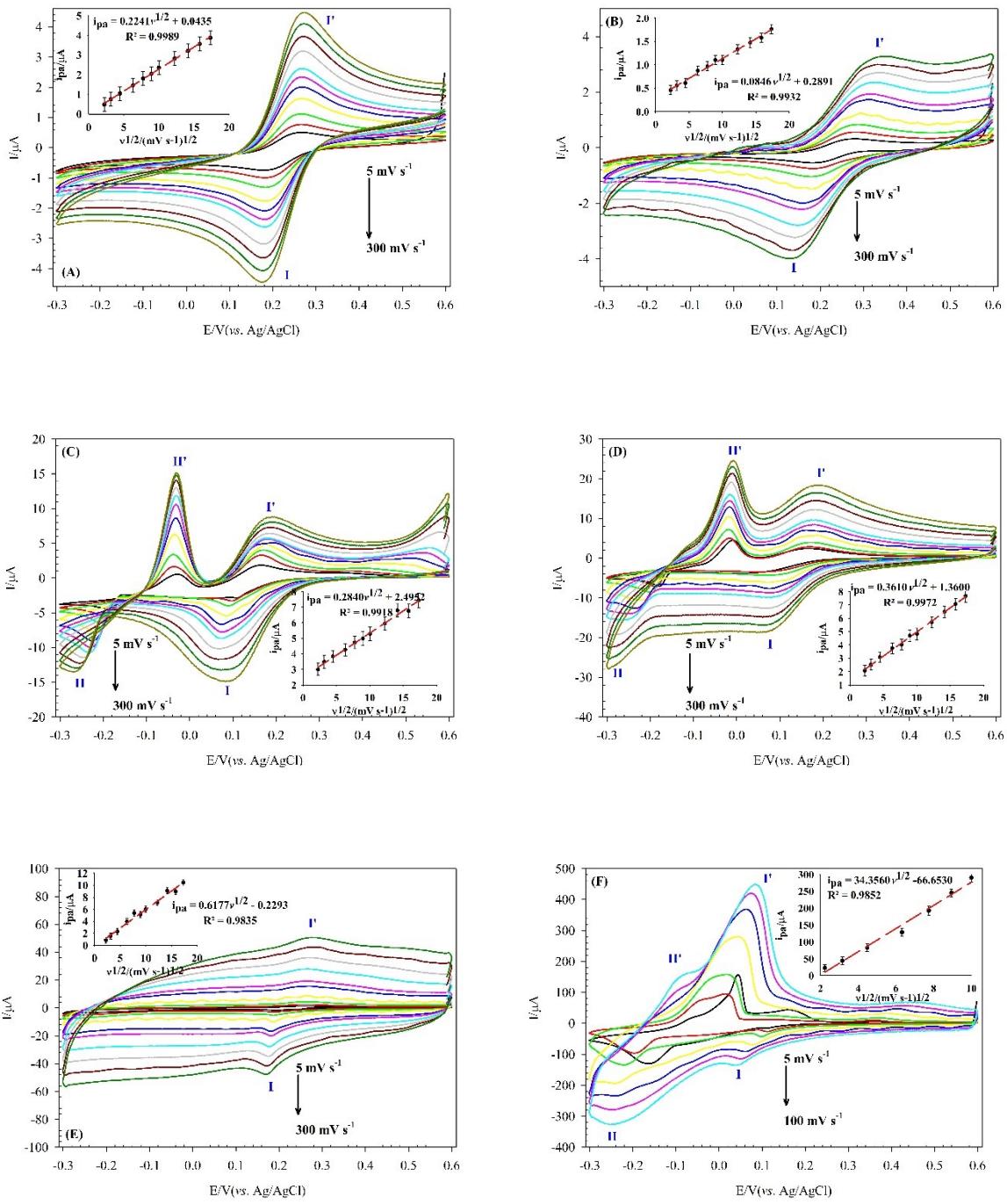


Figure S3. CVs obtained in the presence of 0.5 mM $[Fe(CN)_6]^{3-/4-}$ in 0.01 M PBS (pH 3) containing 0.1 M KCl on the (A) bare GCE, (B) SiW₁₁Co/GCE, (C) Cu-BTC/GCE, (D) SiW₁₁Co@Cu-BTC/GCE, (E) MWCNTs-COOH/GCE, and (F) SiW₁₁Co@Cu-BTC/MWCNTs-COOH at different scan rates. The insets show variations of i_{pa} (peak I') with square root of scan rates.

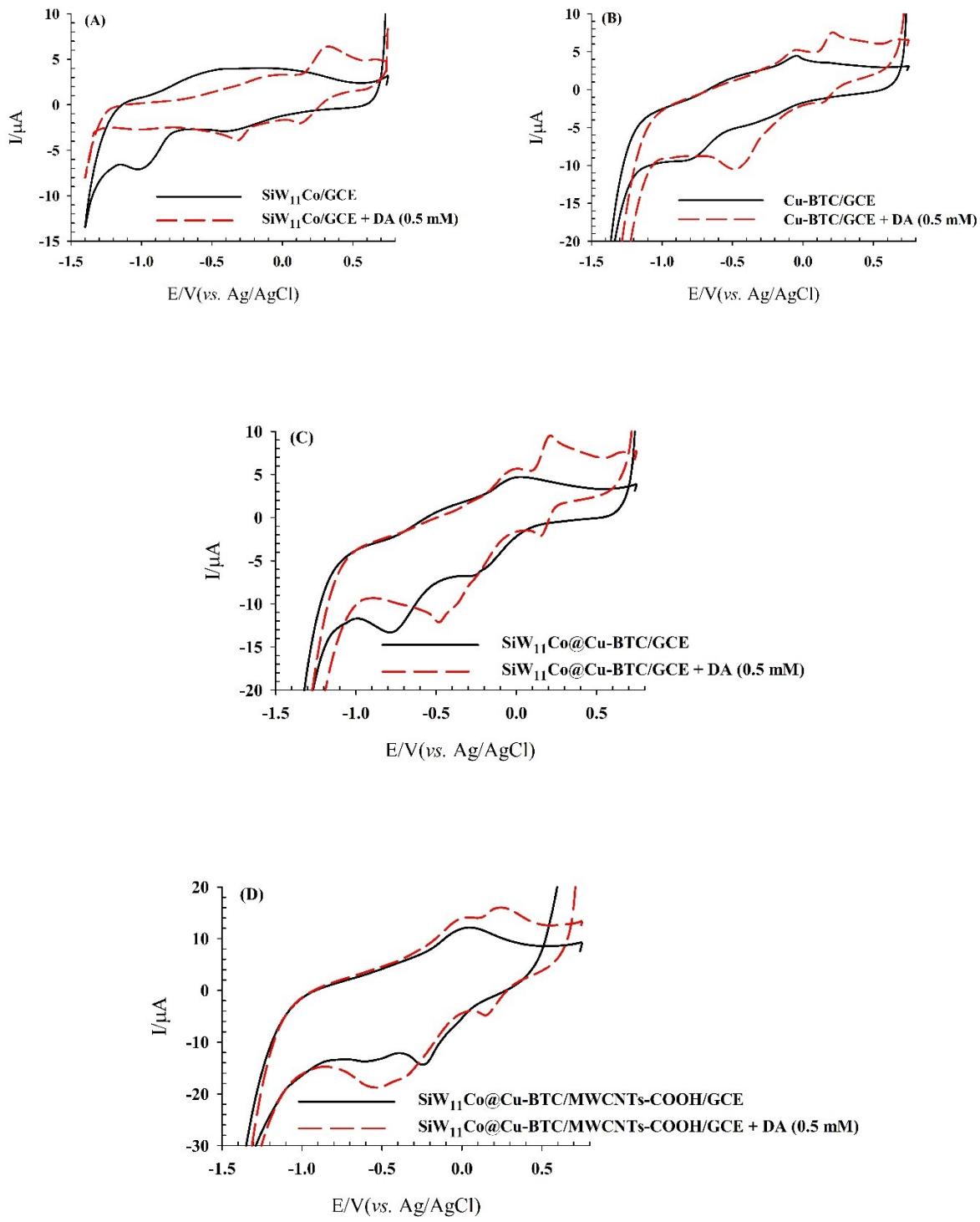


Figure S4. Responses of (A)Si_W₁₁Co/GCE, (B) Cu-BTC/GCE, (C) Si_W₁₁Co@Cu-BTC/GCE, and (D) Si_W₁₁Co@Cu-BTC/MWCNTs-COOH/GCE to 0.5 mM DA in 0.04 M BRB (pH 7) by CV; scan rate 50 mVs⁻¹

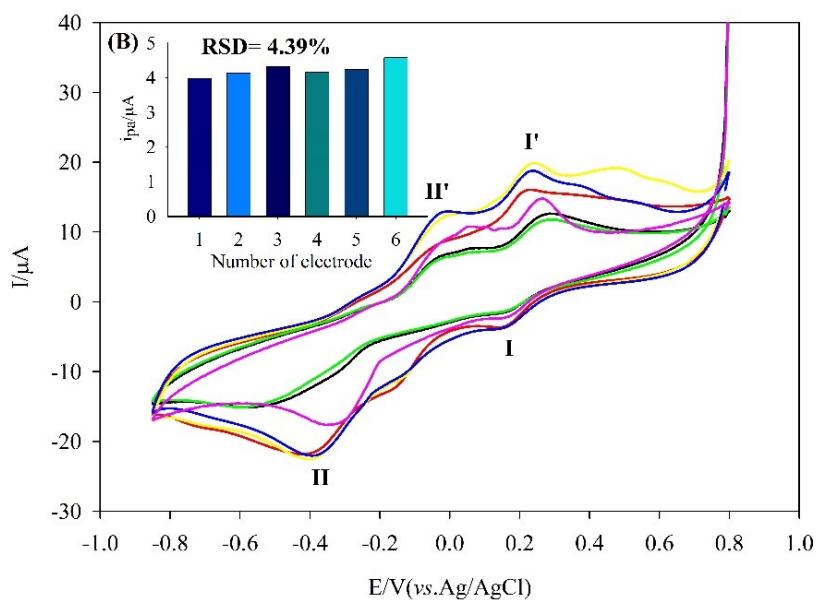
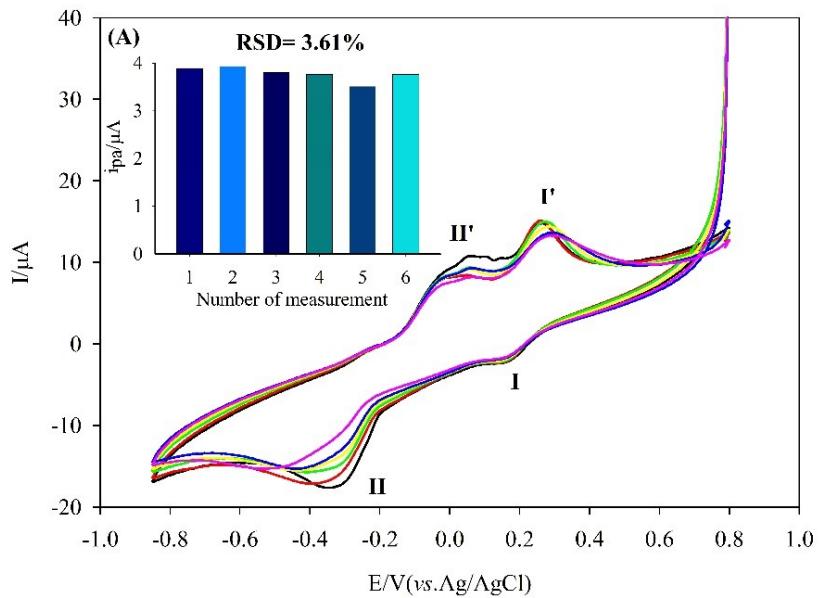


Figure S5. (A) Repeatability, and (B) Reproducibility of $\text{SiW}_{11}\text{Co@Cu-BTC/MWCNTs-COOH/GCE}$ in 0.04 M BRB (pH 7) containing 0.5 mM DA, by CV; Scan rate 50 mVs^{-1} , insets show histogram of the peak current of each measurement.