Tuning the Electrocrystallization Parameters of Semiconducting $Co[TCNQ]_2$-Based Material to Yield Either Single Nanowires or Crystalline Thin Films

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Supporting Information

Figure S1: Voltammograms obtained at scan rate of 100 mV s^{-1} with a 3 mm diameter GC electrode in acetonitrile (0.1 M $[NBu_4][ClO_4]$) showing the effect of $Co^{2+}_{(MeCN)}$ concentration on the stripping process I_{ox} at a [1:2] $Co^{2+}_{(MeCN)}$: TCNQ ratio.

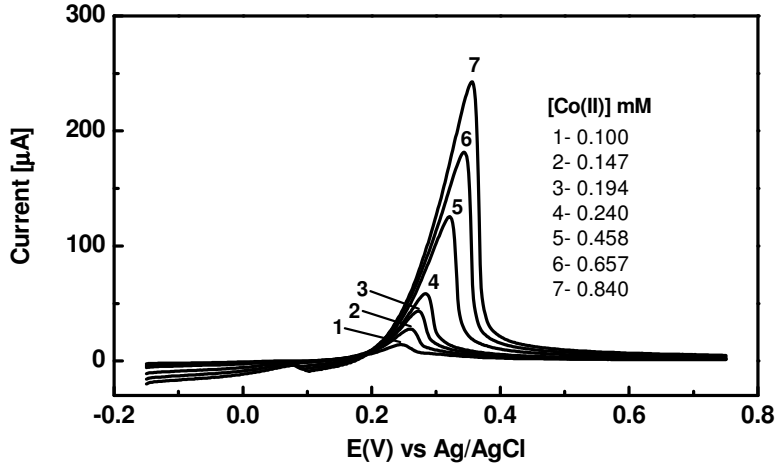

Figure S2: EQCM data (current – black, mass – red) obtained under conditions of cyclic voltammetry at scan rate of 100 mV s^{-1} using a 5 mm diameter Au electrode for 1.0 mM $Co(NO_3)_2.6H_2O$ and 2.0 mM TCNQ (1:2) ratio in acetonitrile (0.1 M $[NBu_4][ClO_4]$) at switching potential (E_s) of 0.065 V.

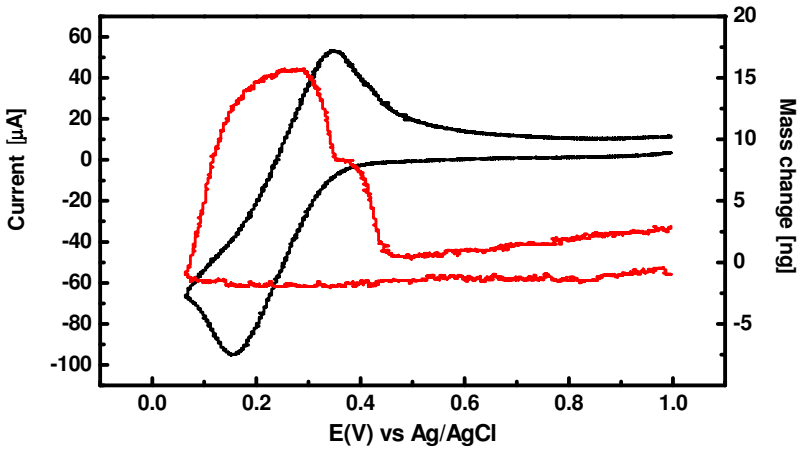

Figure S3: Potential cycling experiment (5, 10, 15, 20 cycles shown) obtained for a mixture of 1.10 $Co(ClO_4)_2.6H_2O$ and 2.20 mM TCNQ at [1:2] ratio in acetonitrile (0.1 M $[NBu_4][ClO_4]$) with a 3 mm GC electrode at scan rate of 100 mV s^{-1}.

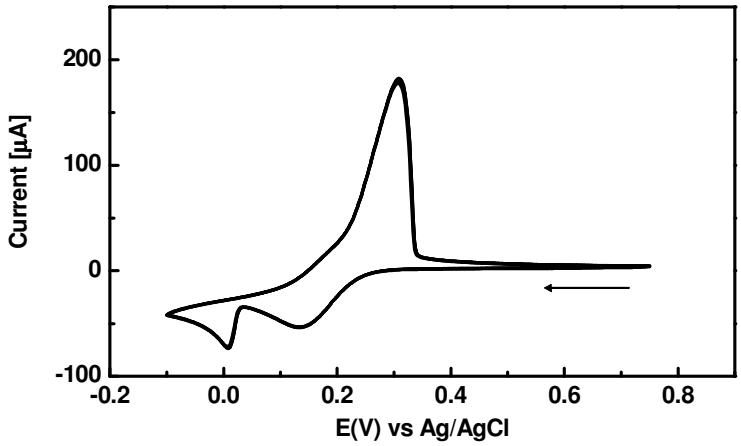

Figure S4: EQCM data showing mass gain as a function of switching potential obtained under conditions of cyclic voltammetry at scan rate of 100 mV s^{-1} using a 5 mm diameter Au electrode for 1.0 mM $Co(NO_3)_2.6H_2O$ and 2.0 mM TCNQ (1:2) ratio in acetonitrile (0.1 M $[NBu_4][ClO_4]$).

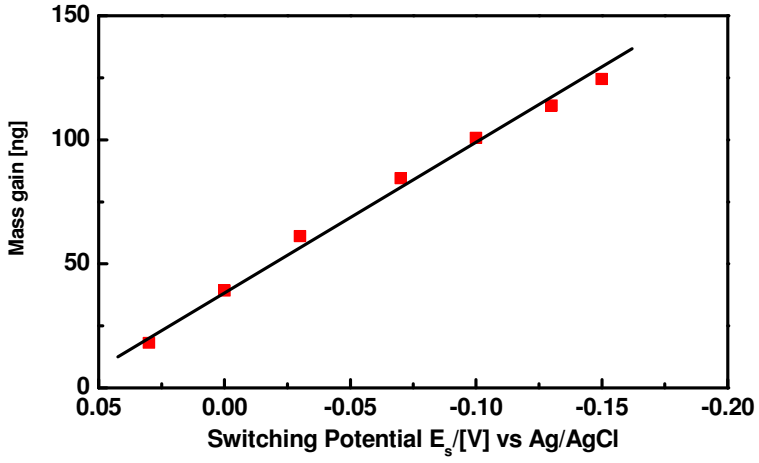

Figure S5: IR spectra of $Co[TCNQ]_2(H_2O)_2$ solid isolated after reductive electrolysis at a large Pt foil electrode of a solution containing 5.0 mM $Co(ClO_4)_2.6H_2O$ and 10.0 mM TCNQ [1:2] ratio at the potential of process I_{red} for 10 hrs in acetonitrile (0.1 M $[NBu_4][ClO_4]$)

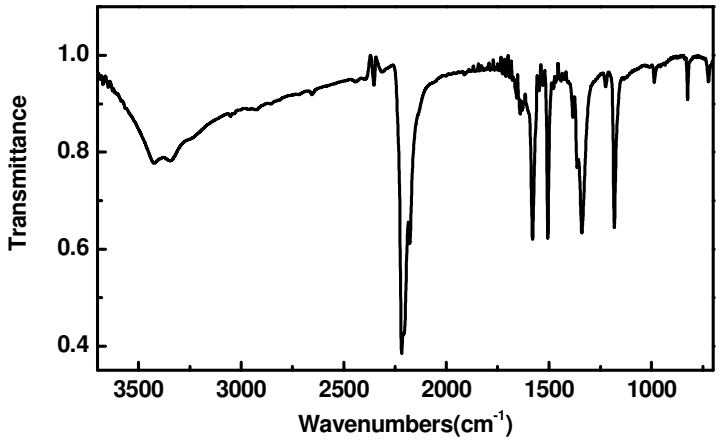

Figure S6: TGA data for electrocrystallized $Co[TCNQ]_2(H_2O)_2$

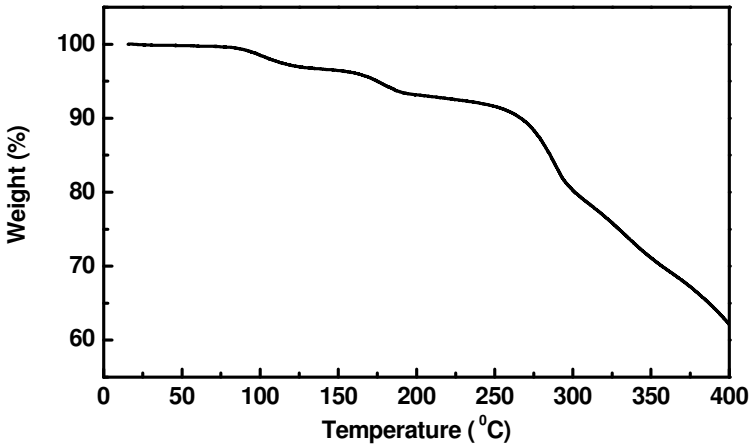

Figure S7: (a) SEM image for $Co[TCNQ]_2(H_2O)_2$ electrocrystallized from a solution containing 5.0 mM $Co(ClO_4)_2.6H_2O$ and 10.0 mM TCNQ (1:2 ratio) in acetonitrile (0.1 M $[Bu_4N][ClO_4]$) onto an ITO electrode at –0.1 V for 180 s. (b) SEM images of isolated $Co[TCNQ]_2(H_2O)_2$ solid generated by bulk reductive electrolysis at Pt-foil working electrode under conditions of (a) but using a much longer electrolysis time of 10 hrs.