

Supporting Information

The effect of core material (M= Co, Ni) and catalyst support (N= MWCNTs and rGO) on the performance of M@Pd/N core-shell electrocatalysts for formate oxidation and direct formate-hydrogen peroxide fuel cell

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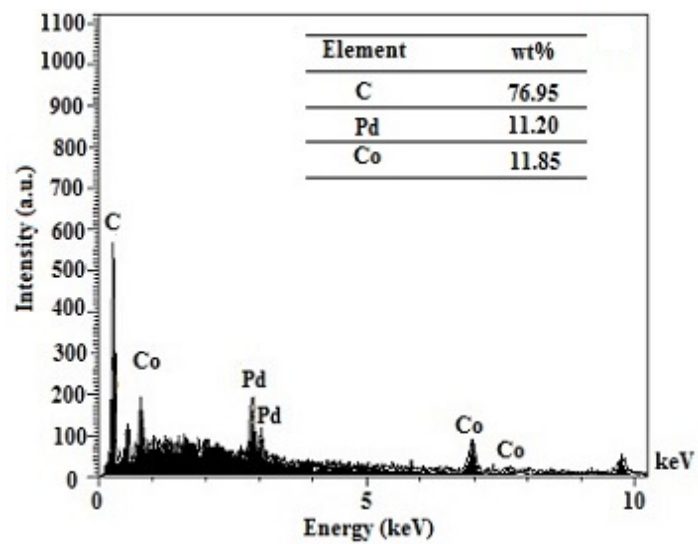


Figure S1. The EDX spectrum of Co@Pd/MWCNTs electrocatalyst.

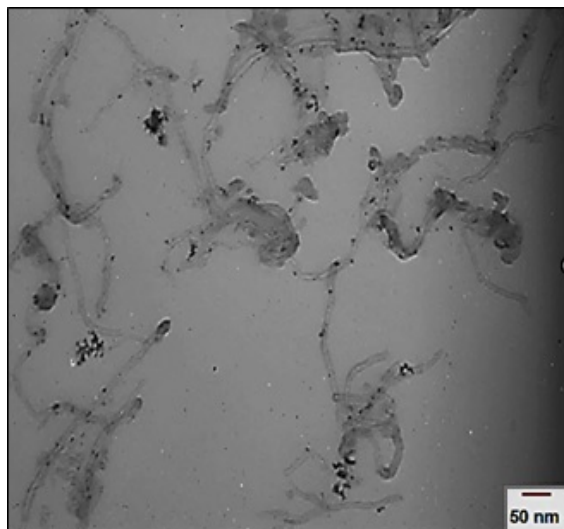


Figure S2. TEM image of carbon nanotubes containing Co@Pd nanoparticles.

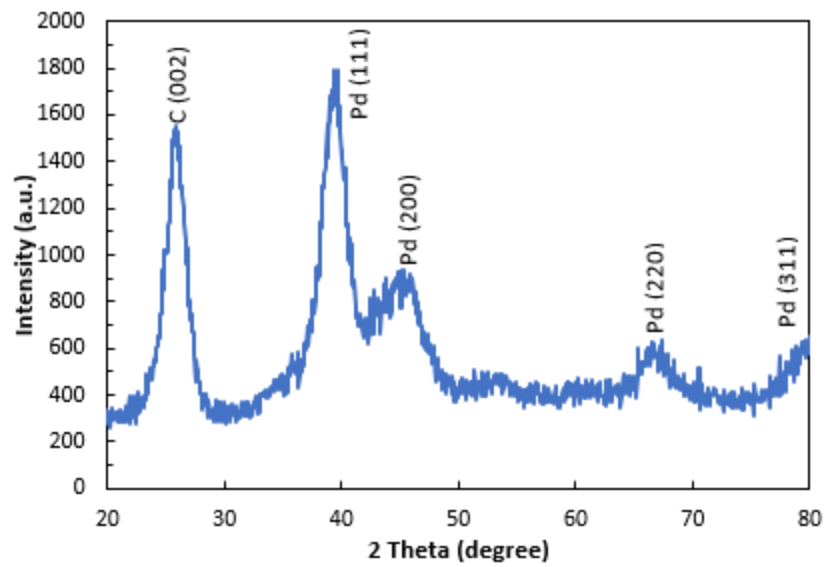


Figure S3. XRD pattern of Co@Pd/MWCNTs electrocatalyst.

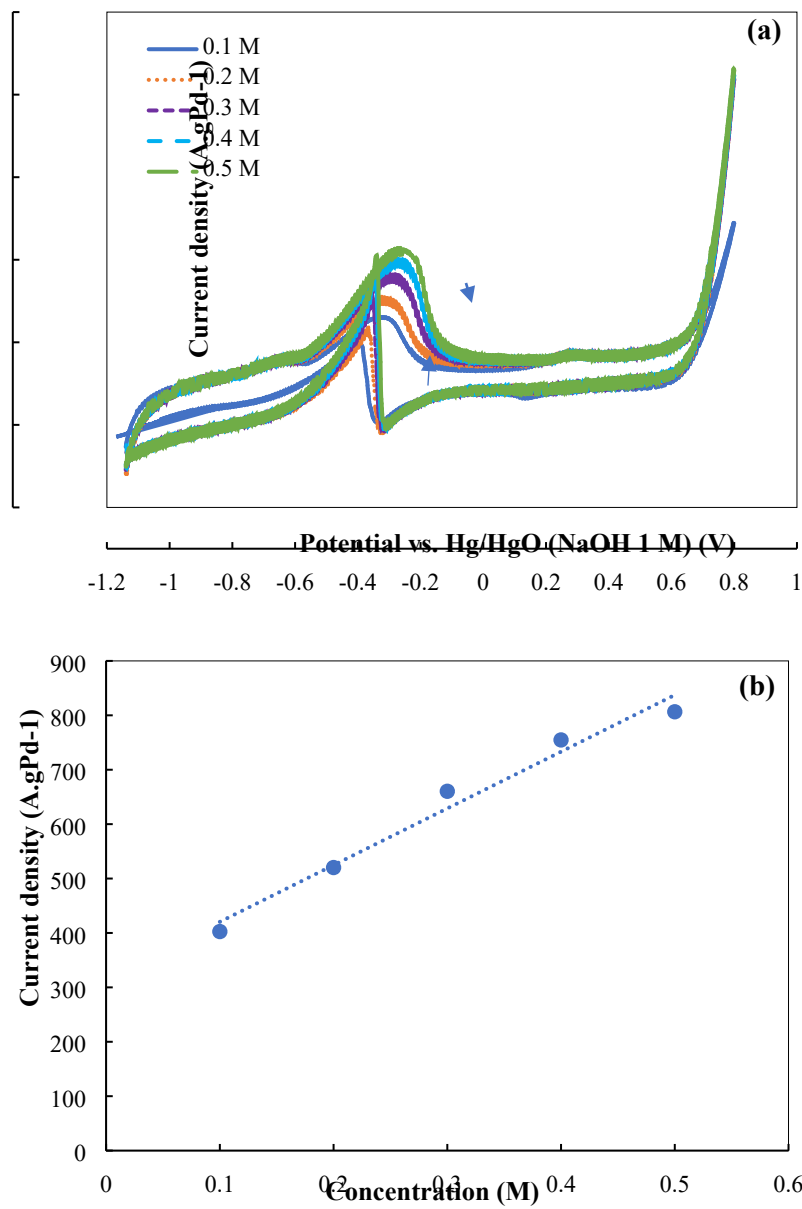


Figure S4. (a) The effect of sodium formate concentration (0.1, 0.2, 0.3, 0.4, 0.5 M) on CVs, (b) the plot of I_p against C_{HCOONa} for a Co@Pd/MWCNTs electrocatalyst.

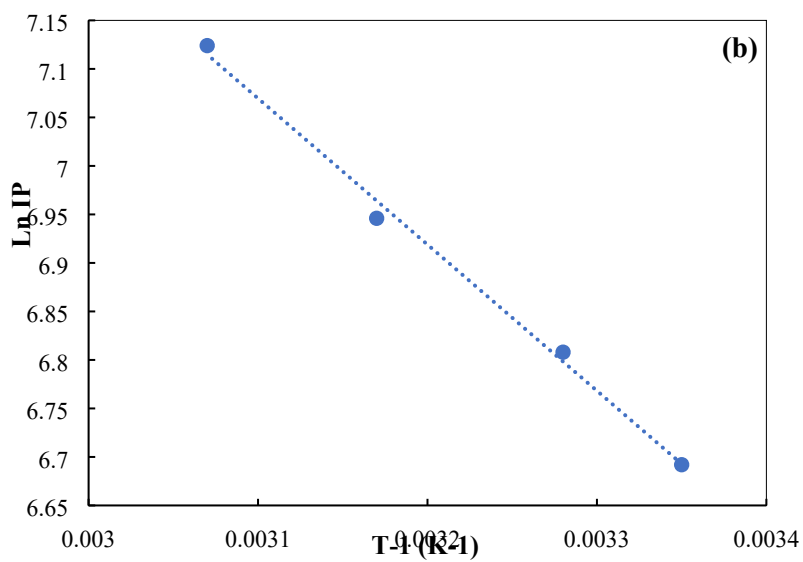
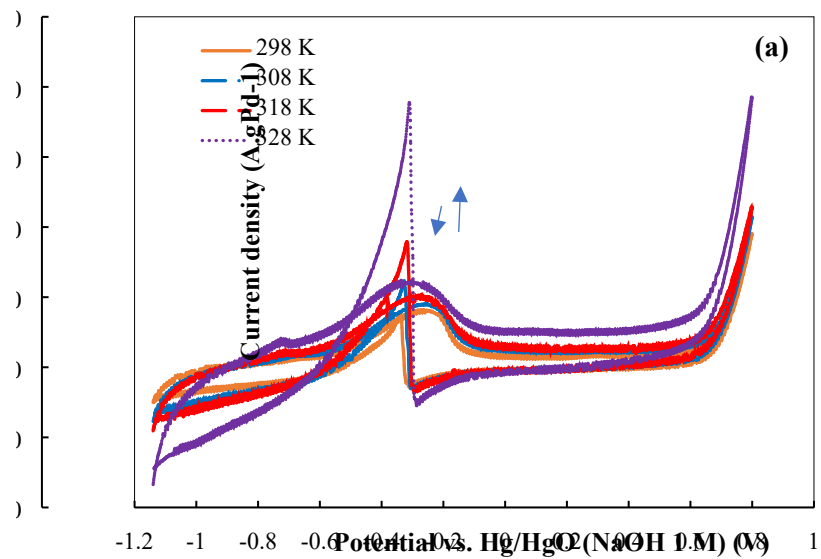


Figure S5. (a) The effect of different temperatures (298, 308, 318 and 328 K) on CVs in a solution of 1 M NaOH + 0.5 M formate, (b) The plot of $\ln I_p$ with respect to T^{-1} for Co@Pd/MWCNTs.

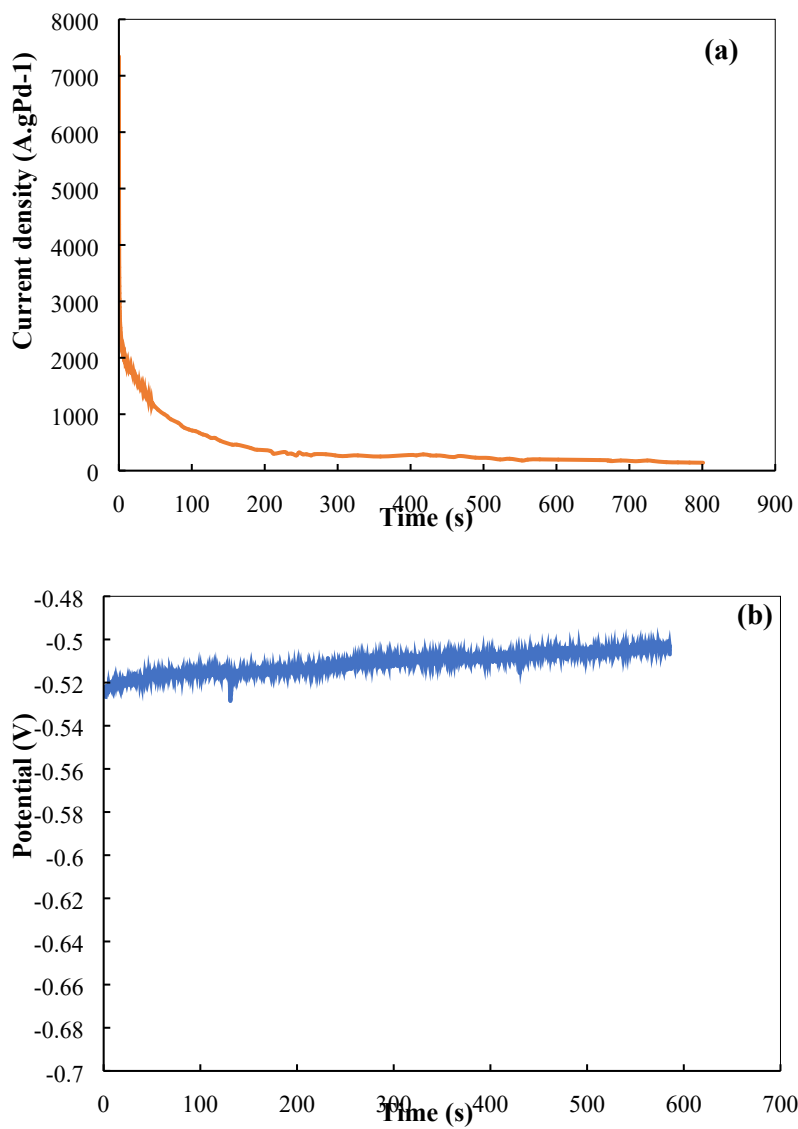


Figure S6. (a) Chronoamperometry under constant potential (-0.37 V) and (b) chronopotentiometry under constant current (0.05 mA) for Co@Pd/MWCNTs in an alkaline solution of 0.5 M HCOONa.

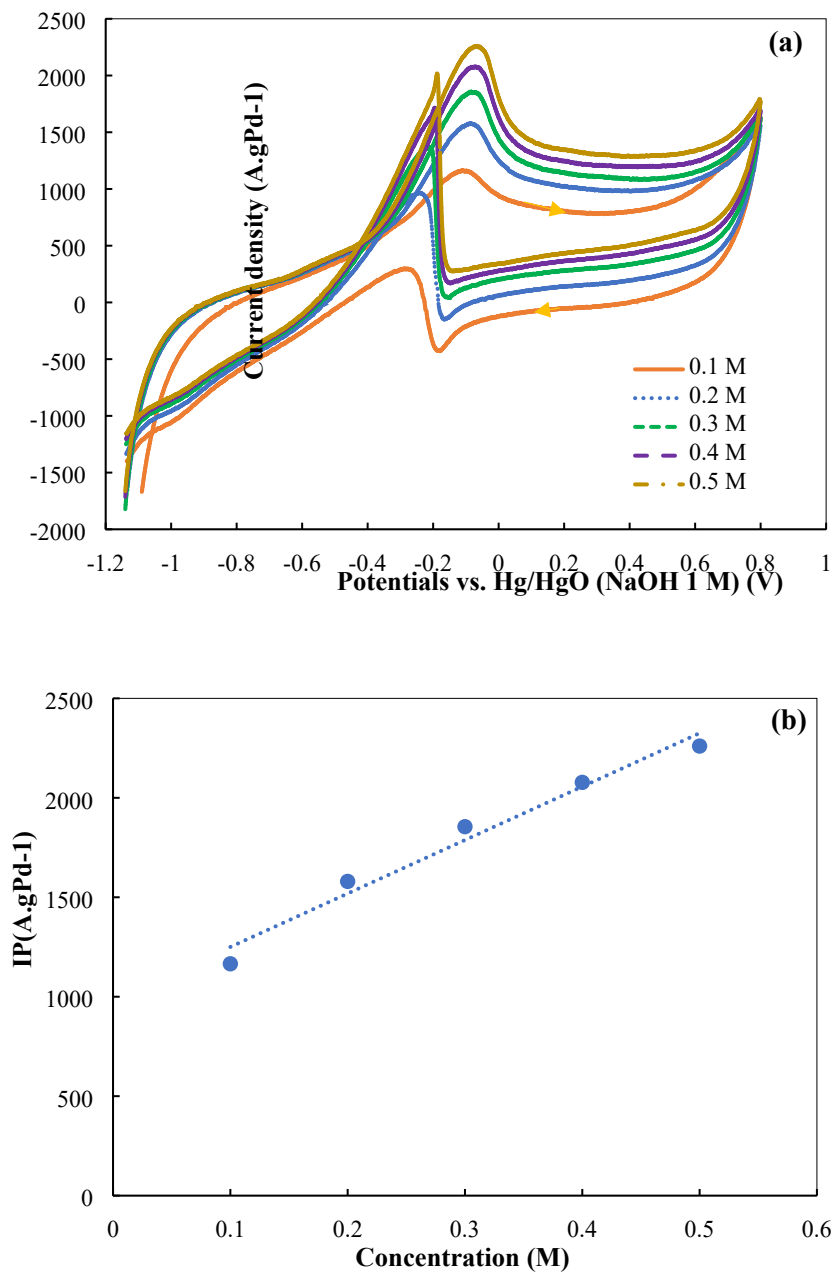


Figure S7. (a) The effect of sodium formate concentration (0.1, 0.2, 0.3, 0.4 and 0.5 M) on CVs, (b) plot of I_p - C_{HCOONa} for a Ni@Pd/rGO electrocatalyst.

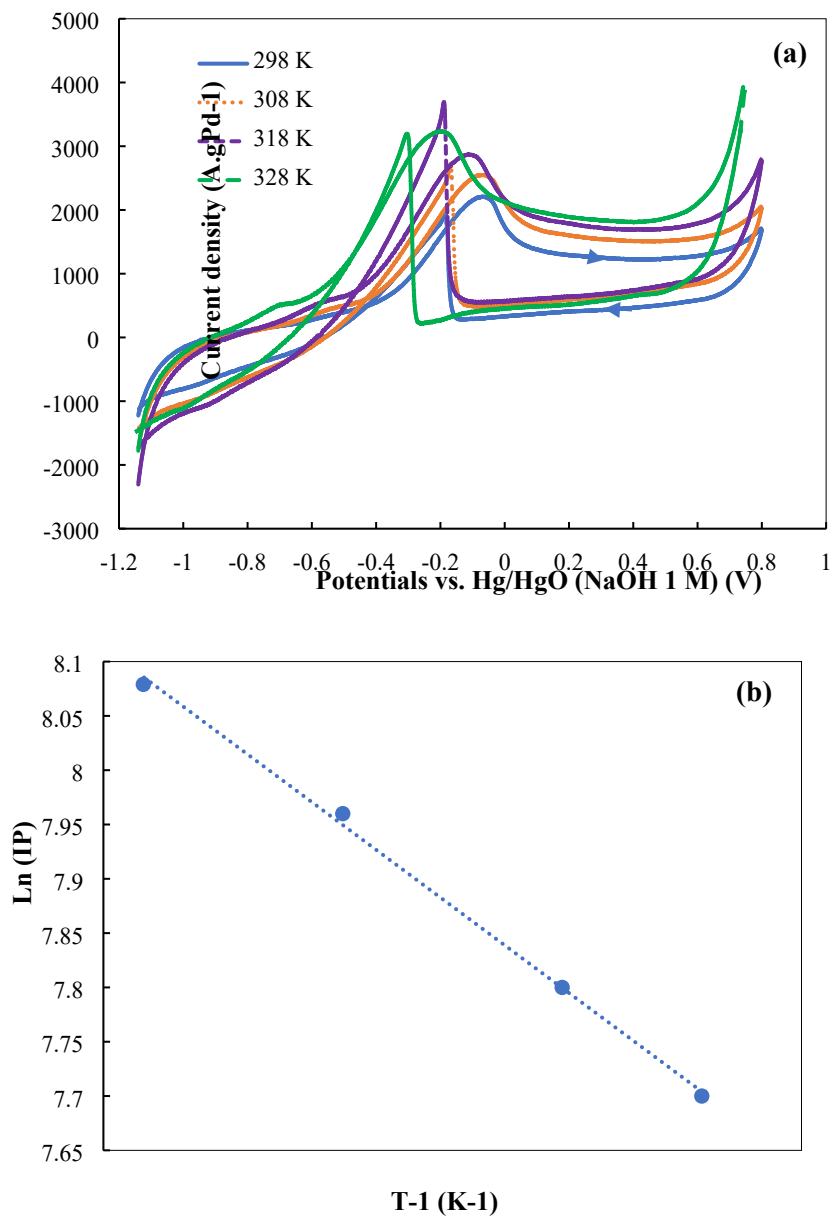


Figure S8. (a) The effect of different temperatures (298, 308, 318 and 328 K) on CVs of sodium formate oxidation in NaOH 1 M + 0.5 M HCOONa, (b) plot of $\ln I_p$ with respect to T^{-1} for the Ni@Pd/rGO electrocatalyst.

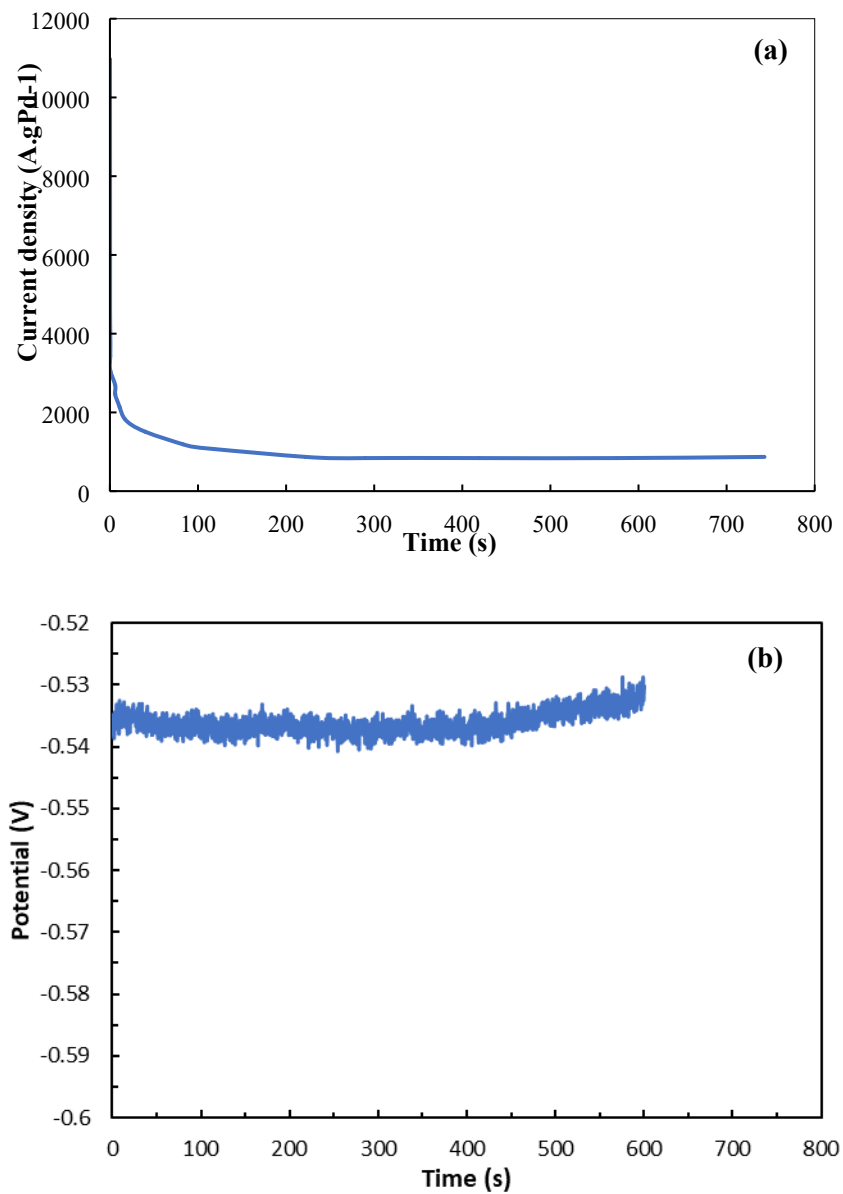
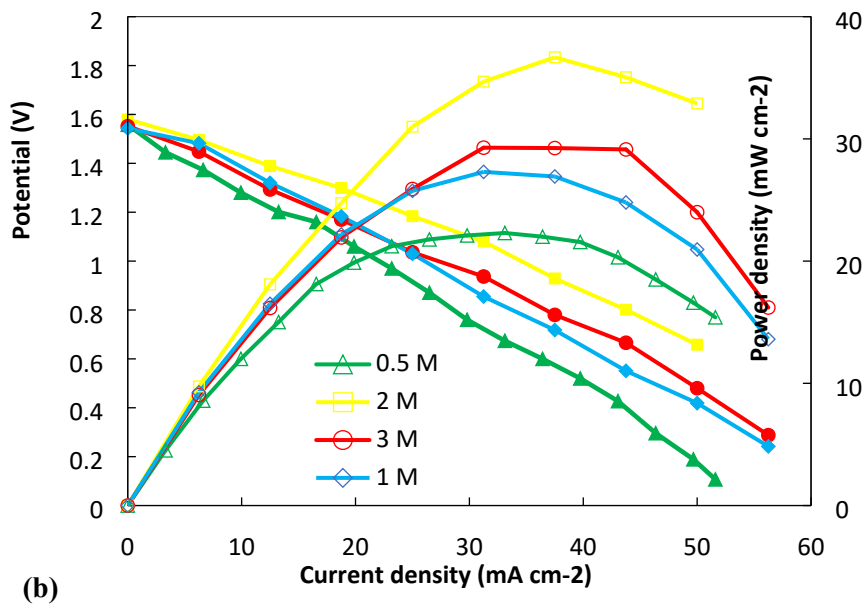
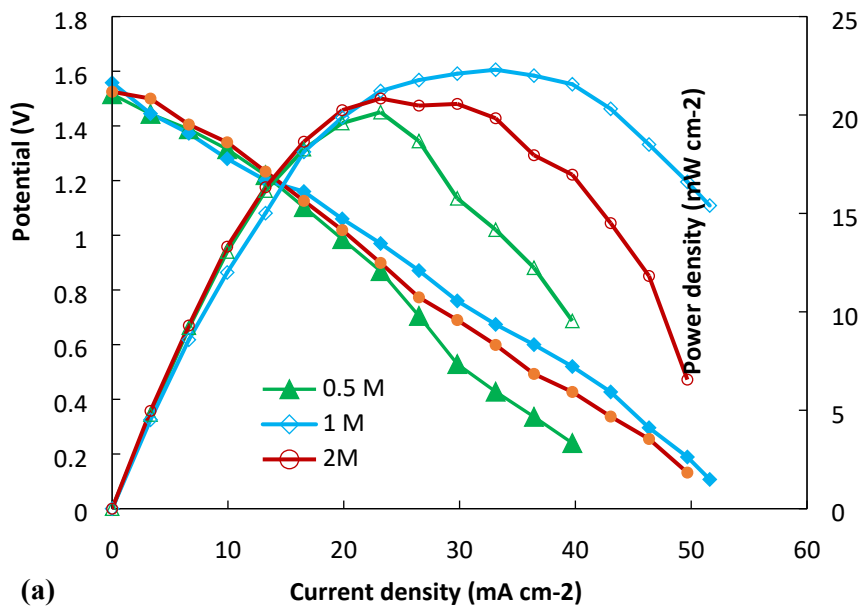


Figure S9. (a) A chronoamperometry curve at -0.37 V, (b) a chronopotentiometry curve at 0.05 mA for the Ni@Pd/rGO catalyst in a solution of 1 M NaOH + 0.5 M sodium formate.



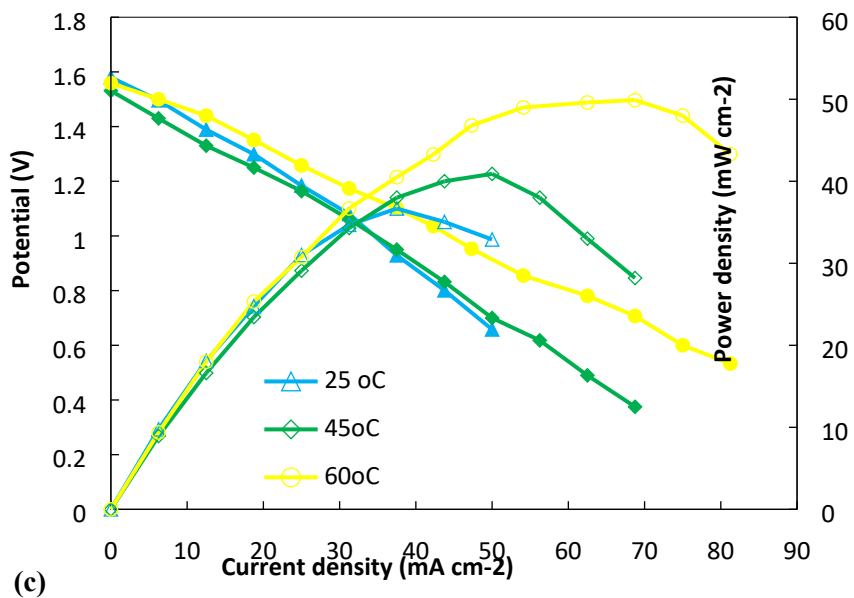
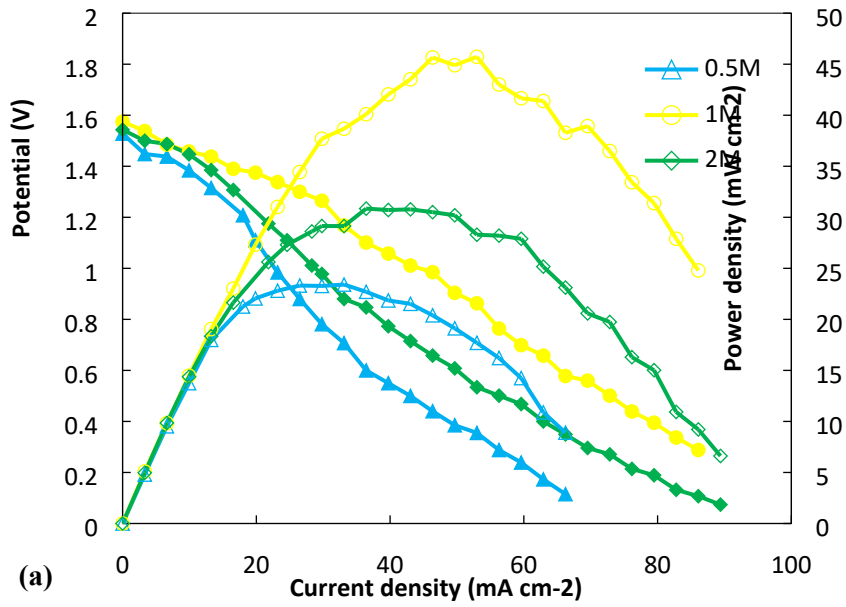
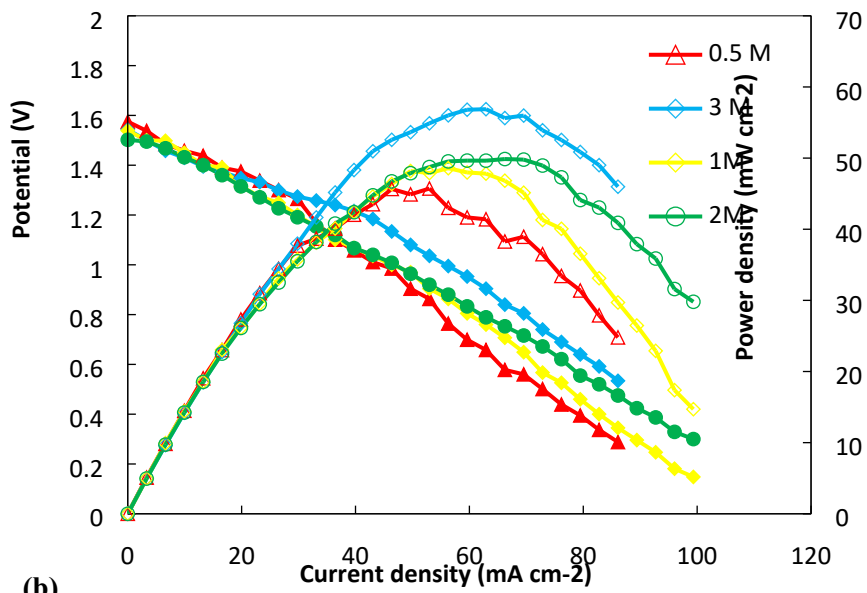


Figure S10. The effect of different concentrations of (a) sodium formate (0.5, 1 and 2 M), (b) hydrogen peroxide (0.5, 1, 2 and 3 M) and (c) different temperatures on I - V and I - P curves of the fuel cell with Co@Pd/MWCNTs as the anodic catalyst.



(a)



(b)

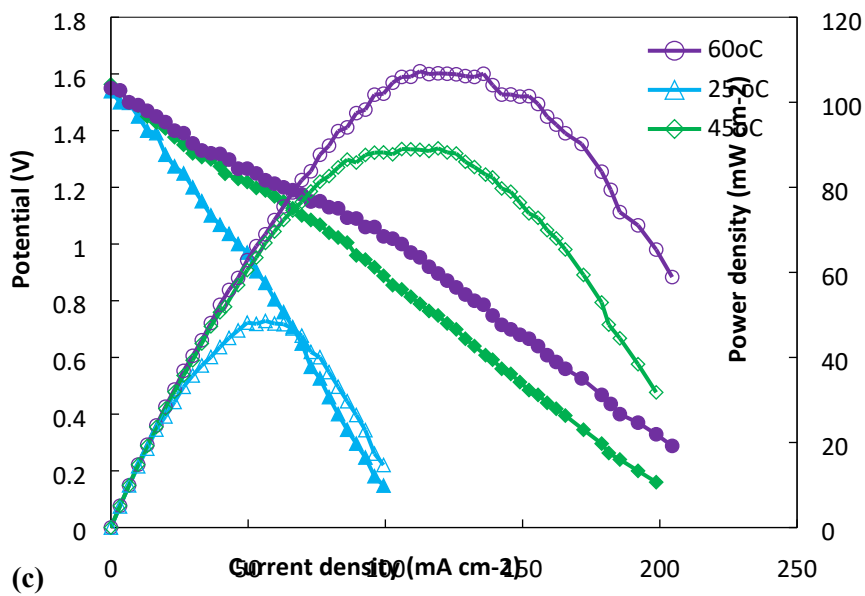


Figure S11. The effect of different concentrations of (a) sodium formate (0.5, 1 and 2 M), (b) hydrogen peroxide (0.5, 1, 2 and 3 M) and (c) different temperatures on I - V and I - P curves of the fuel cell with Ni@Pd/rGO as the anodic catalyst.