

Figure 1S. EDX analysis of (a) Ni₃Au₁-NGQD (b) Ni₁Au₁-NGQD (c) Ni₁Au₃-NGQD electrocatalysts.

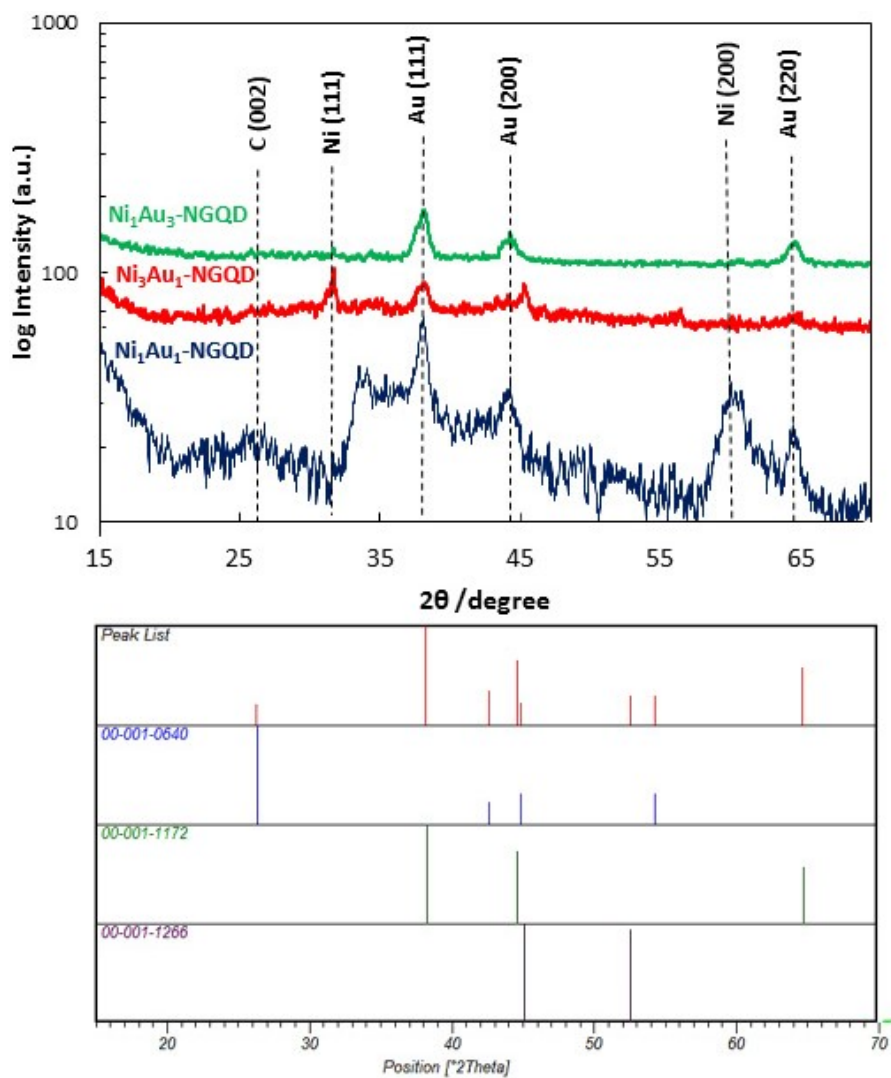


Figure 2S. XRD patterns of $\text{Ni}_1\text{Au}_3\text{-NGQD}$, $\text{Ni}_3\text{Au}_1\text{-NGQD}$ and $\text{Ni}_1\text{Au}_1\text{-NGQD}$ electrocatalysts.

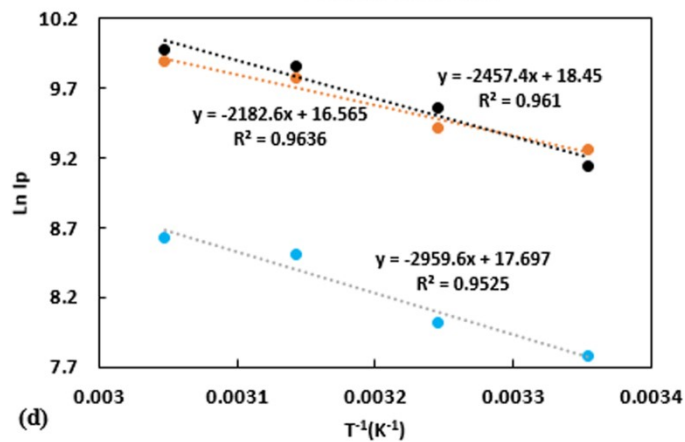
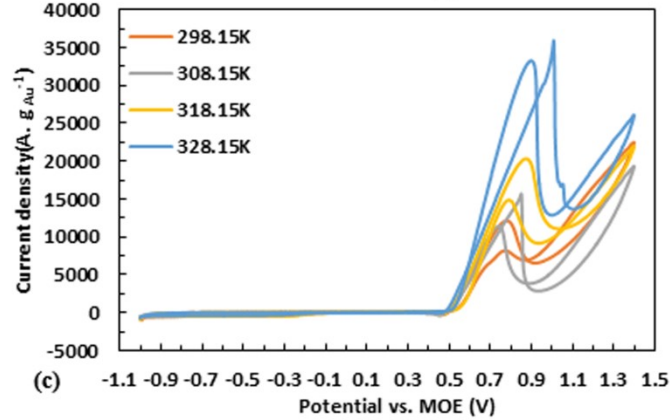
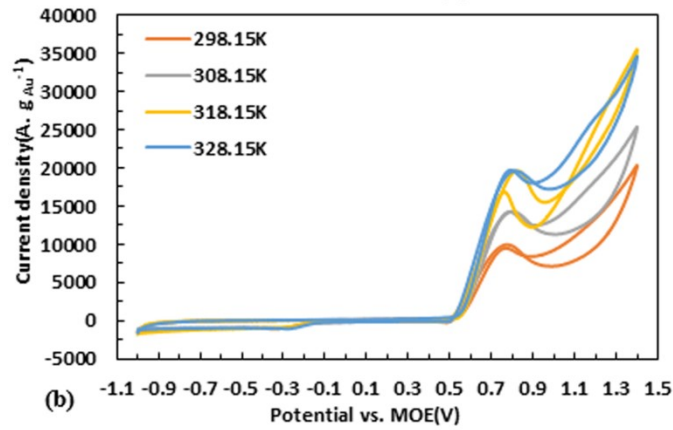
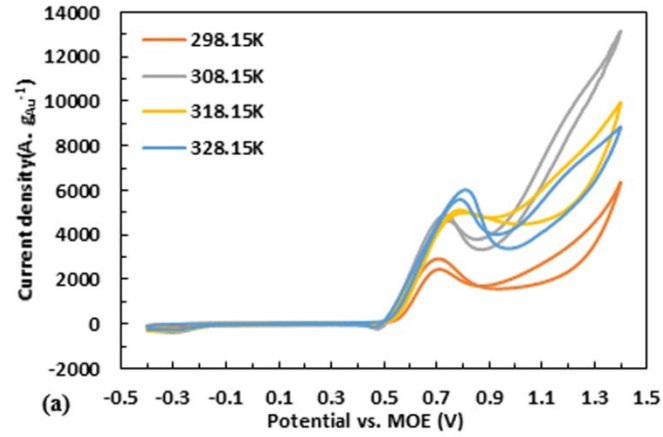


Figure 3S. The effect of temperature on cyclic voltammetry curves of (a) Ni₁Au₃-NGQD (b) Ni₃Au₁-NGQD (c) Ni₁Au₁-NGQD electrocatalysts at the scan rate of 100 mVs⁻¹; (d)

The plot of Ln I_p vs. 1/T for three electrocatalysts in NaOH 0.5 M containing ethanol 0.5

M.

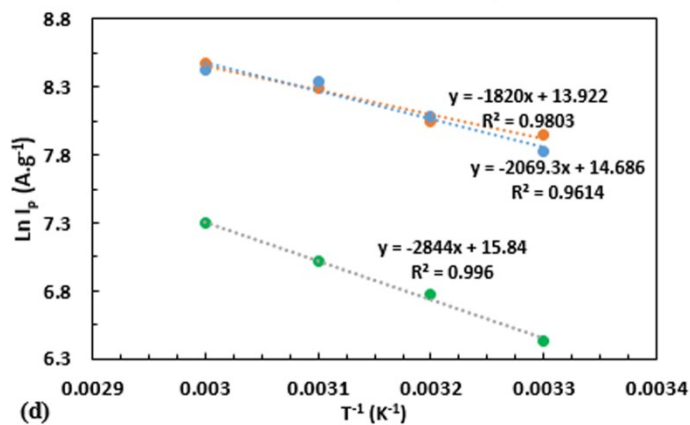
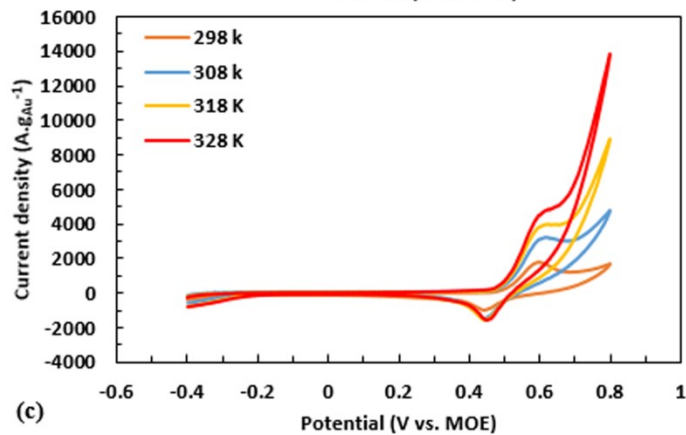
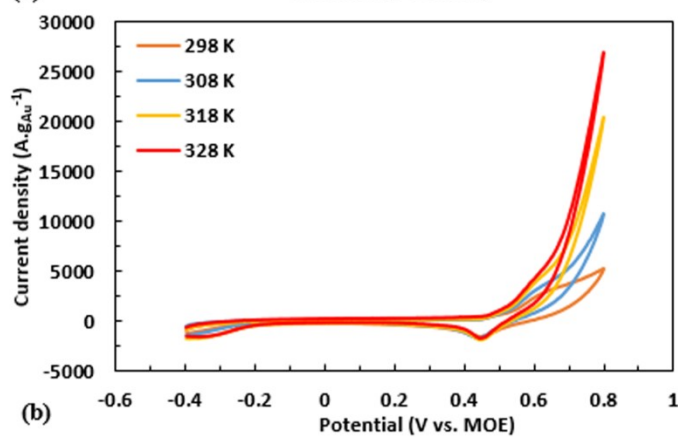
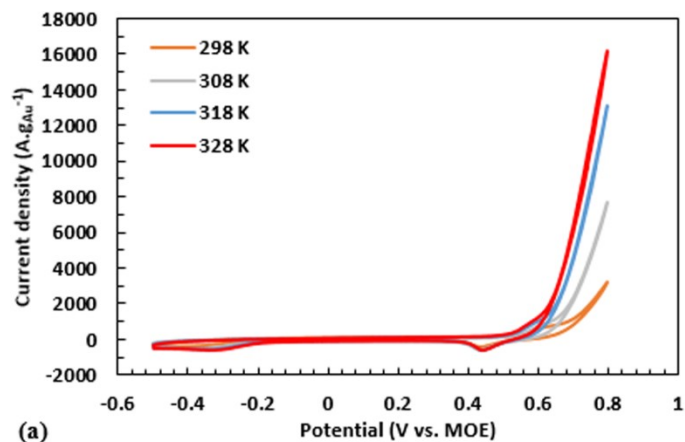


Figure 4S. The effect of temperature on cyclic voltammetry curves of (a) Ni₁Au₃-NGQD (b) Ni₃Au₁-NGQD (c) Ni₁Au₁-NGQD electrocatalysts at the scan rate of 100 mVs⁻¹; (d)

The plot of Ln I_p vs. 1/T for three electrocatalysts in NaOH 0.5 M containing formate 0.5

M.

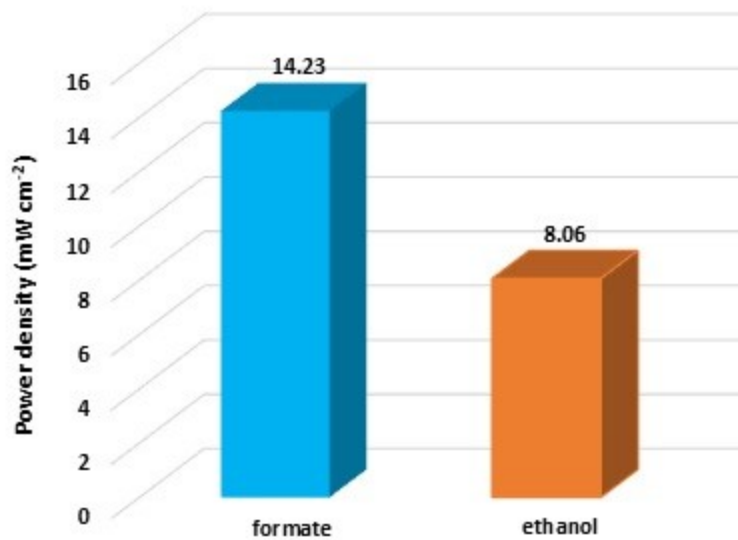


Figure 5S. The comparison graph of fuel cell results for Ni₁Au₁-NGQDs as anodic electrocatalyst at 60 °C using Pt/C as cathodic electrocatalyst in formate and ethanol fuel cells.