Supplementary Information

CaO promoted Graphene-Supported Palladium Nanocrystals as a Universal Electrocatalyst for Direct Liquid Fuel Cells

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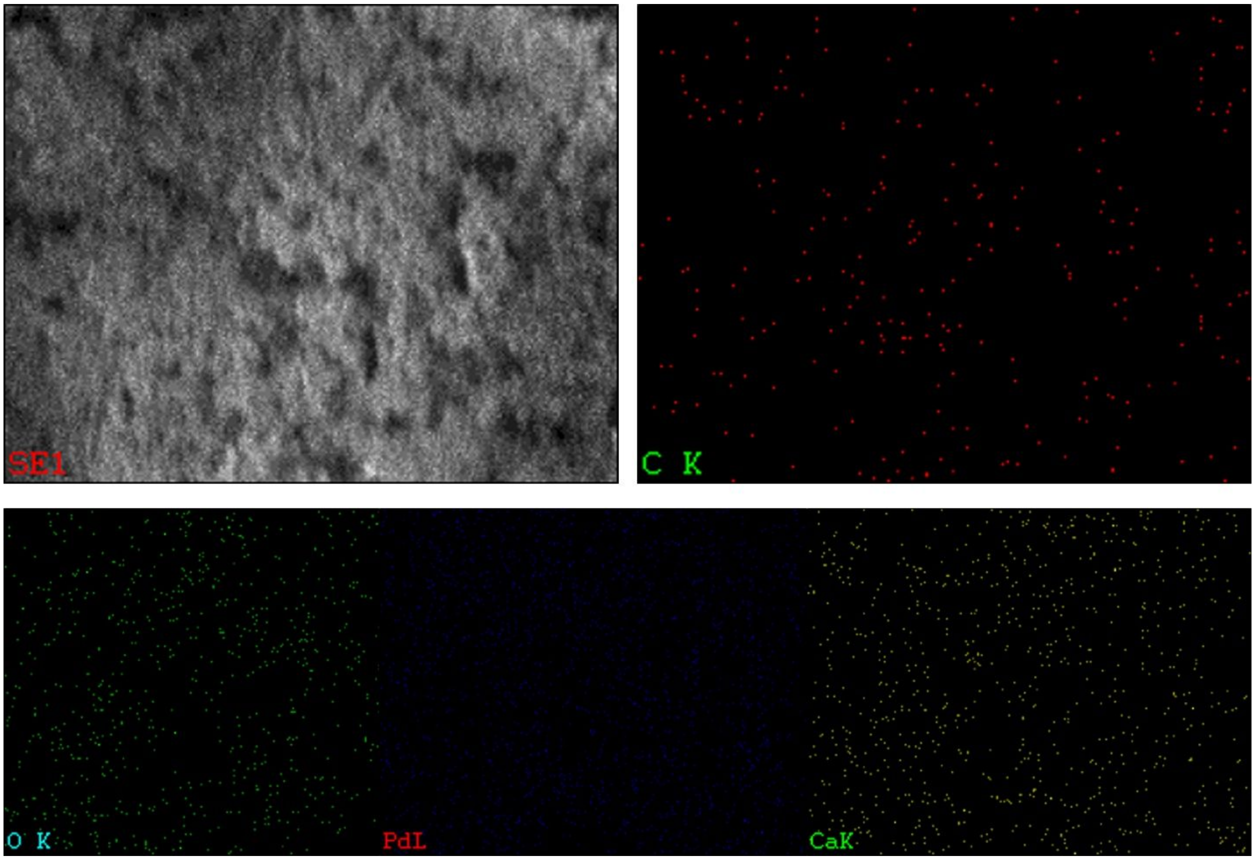

Figure S1. EDX mapping of PdCa/rGO at 0.5µm.

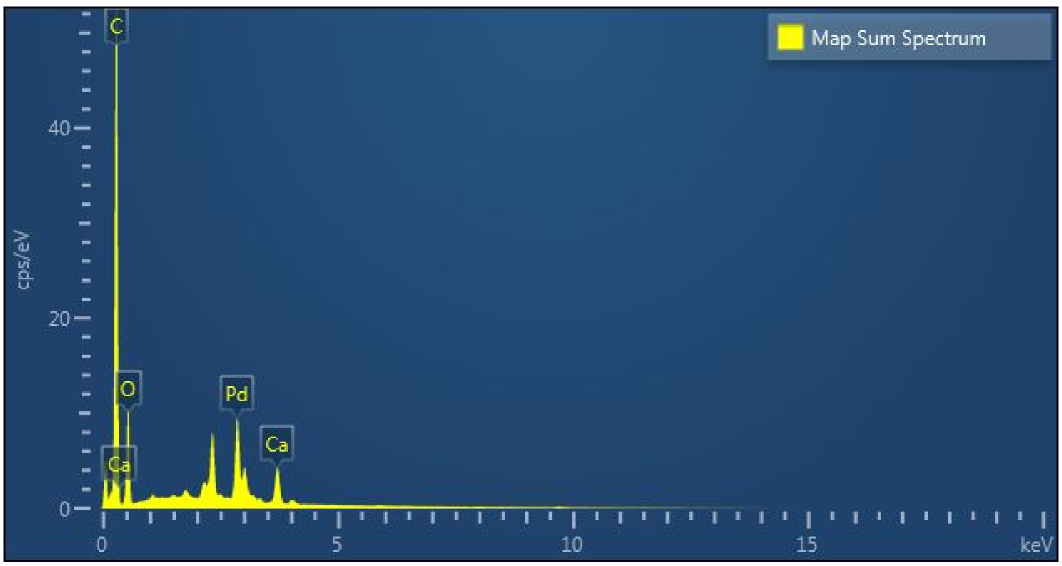

Figure S2. EDX spectrum of PdCa/rGO

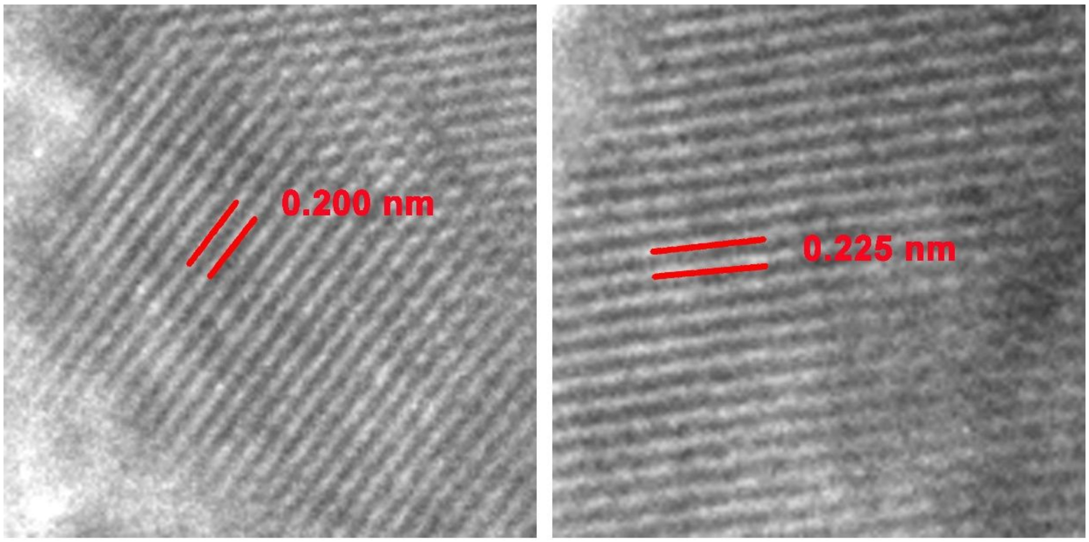

Figure S3. HRTEM of Pd/rGO

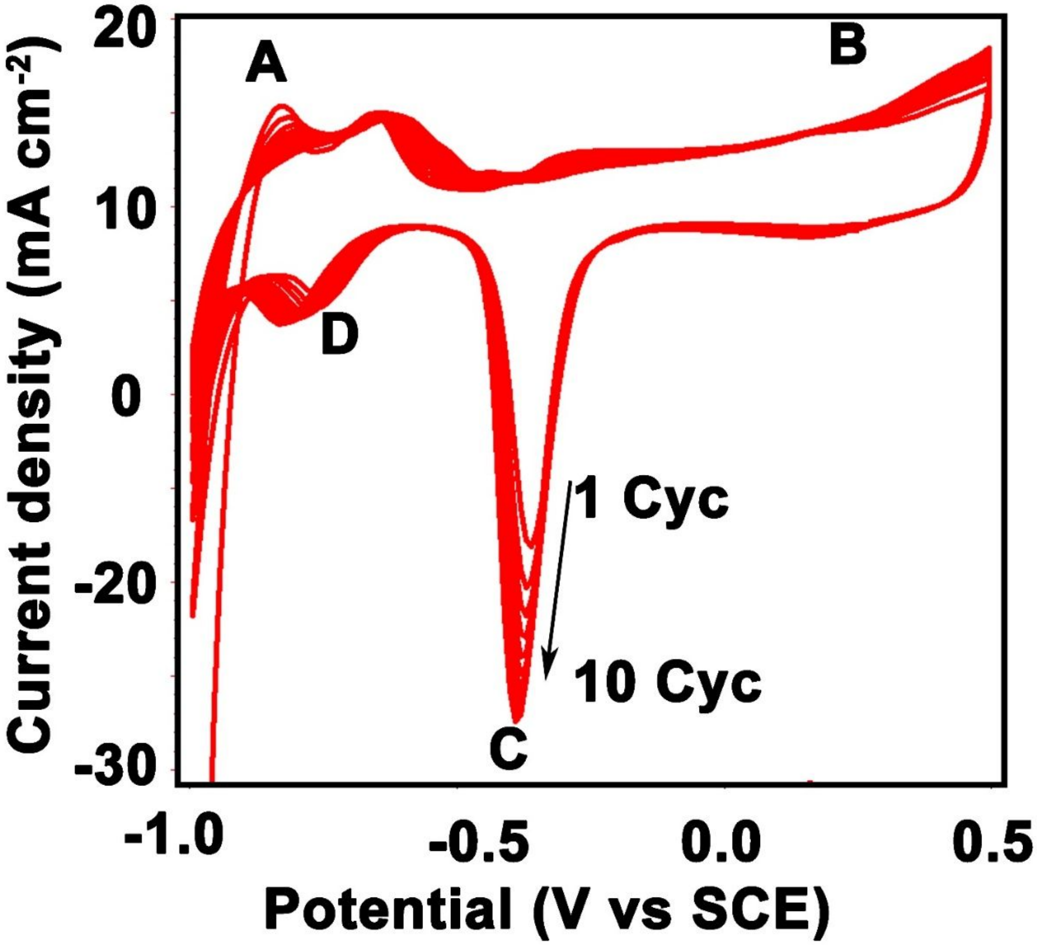

Figure S4. Cyclic voltammetry of PdCa/rGO in 0.5 M KOH at 20 mV/s for 10 Cycles.

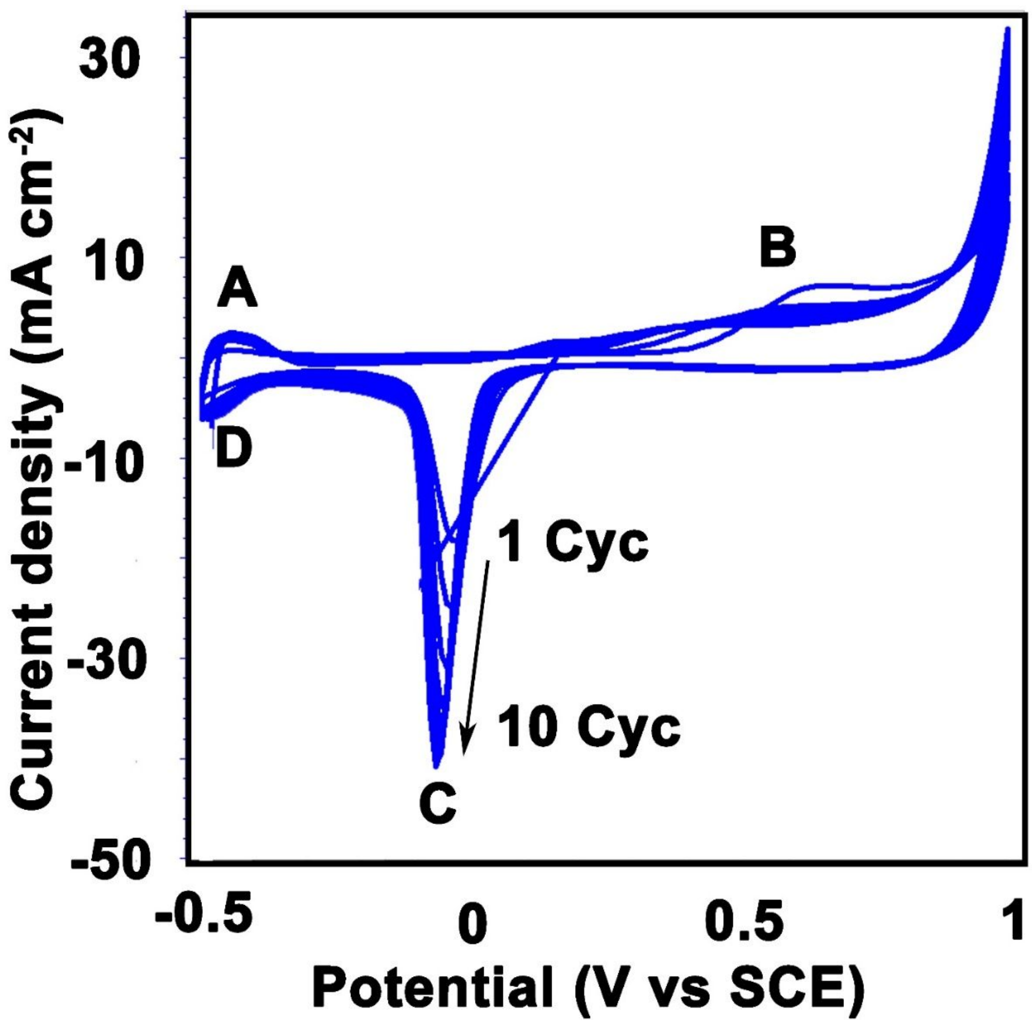

Figure S5. Cyclic voltammetry of PdCa/rGO in 0.5 M $HClO_4$ at 20 mV/s for 10 Cycles.

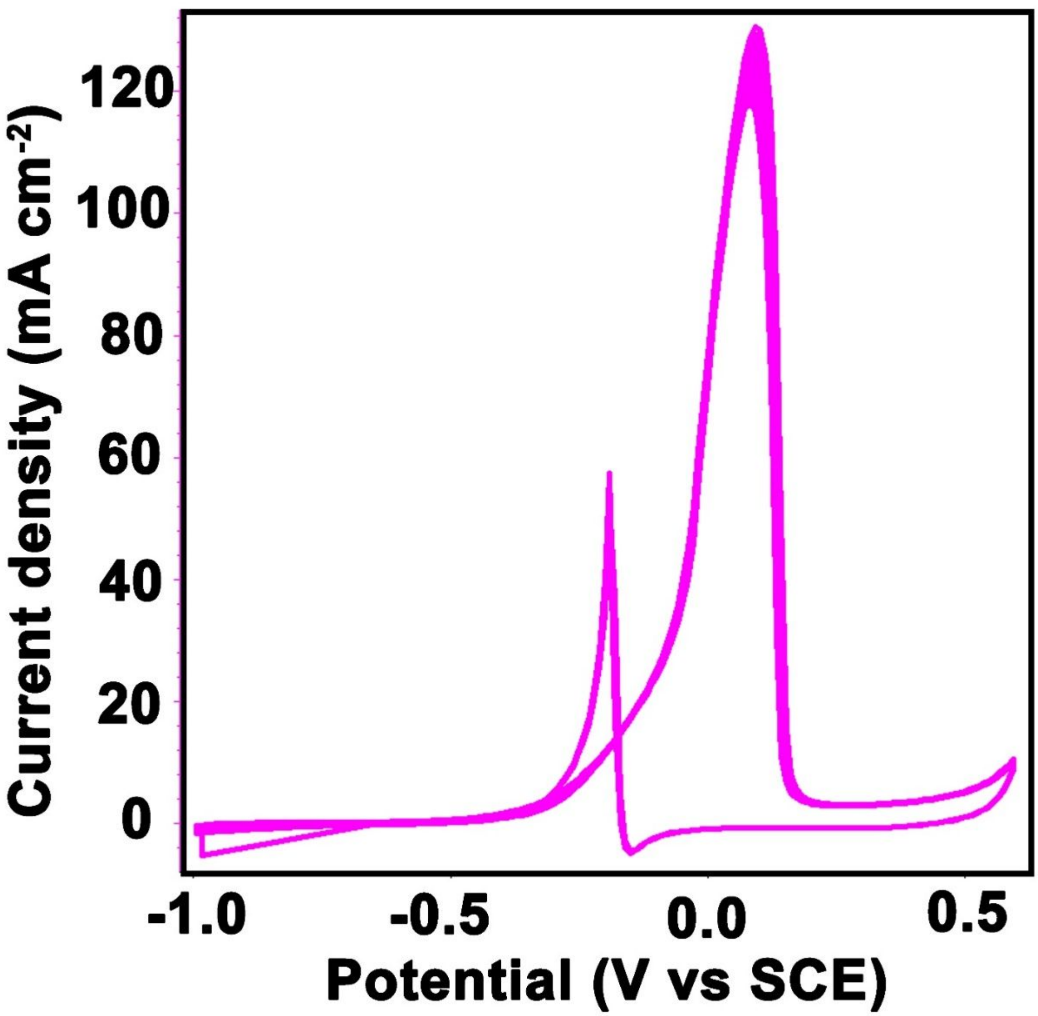

Figure S6. Cyclic voltammograms for 50 cycles obtained for Pd/rGO and PdCa/rGO 0.5 M KOH solution and 0.5 M methanol solution.

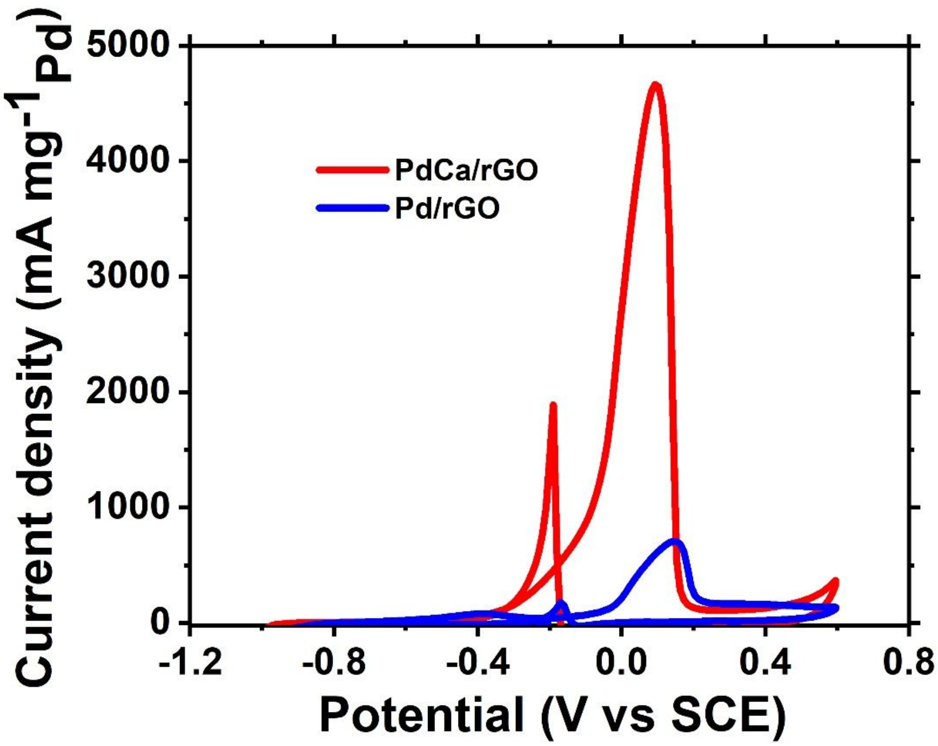

Figure S7. Cyclic voltammograms (mass specific activity) obtained for Pd/rGO and PdCa/rGO 0.5 M KOH solution and 0.5 M methanol solution.

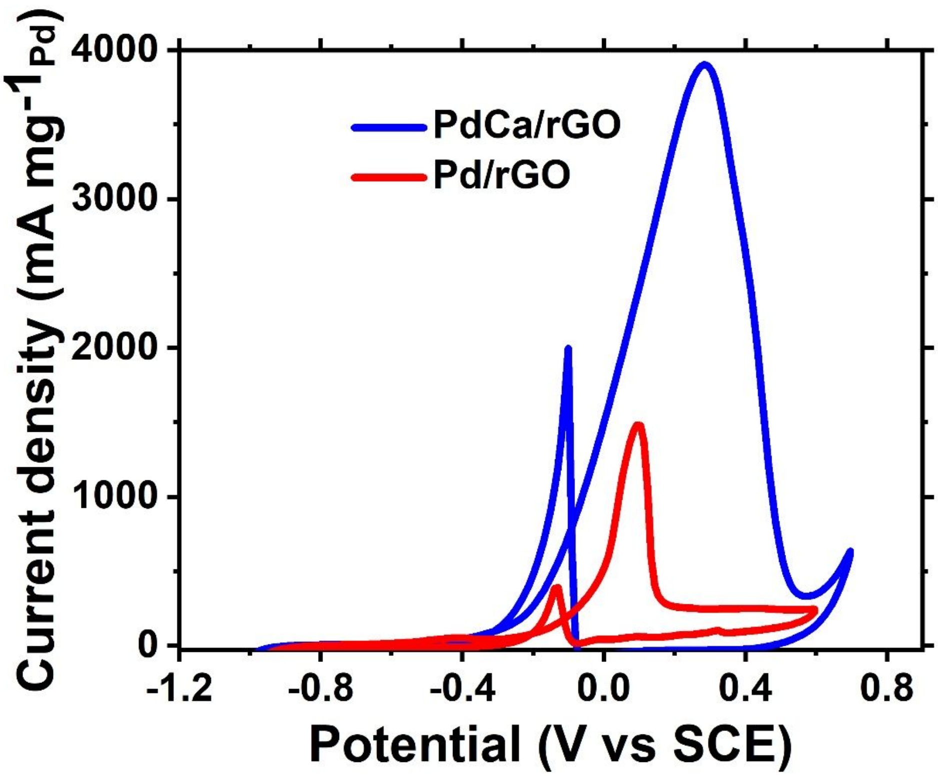

Figure S8. Cyclic voltammograms (mass specific activity) obtained for Pd/rGO and PdCa/rGO 0.5 M KOH solution and 0.5 M ethanol solution.

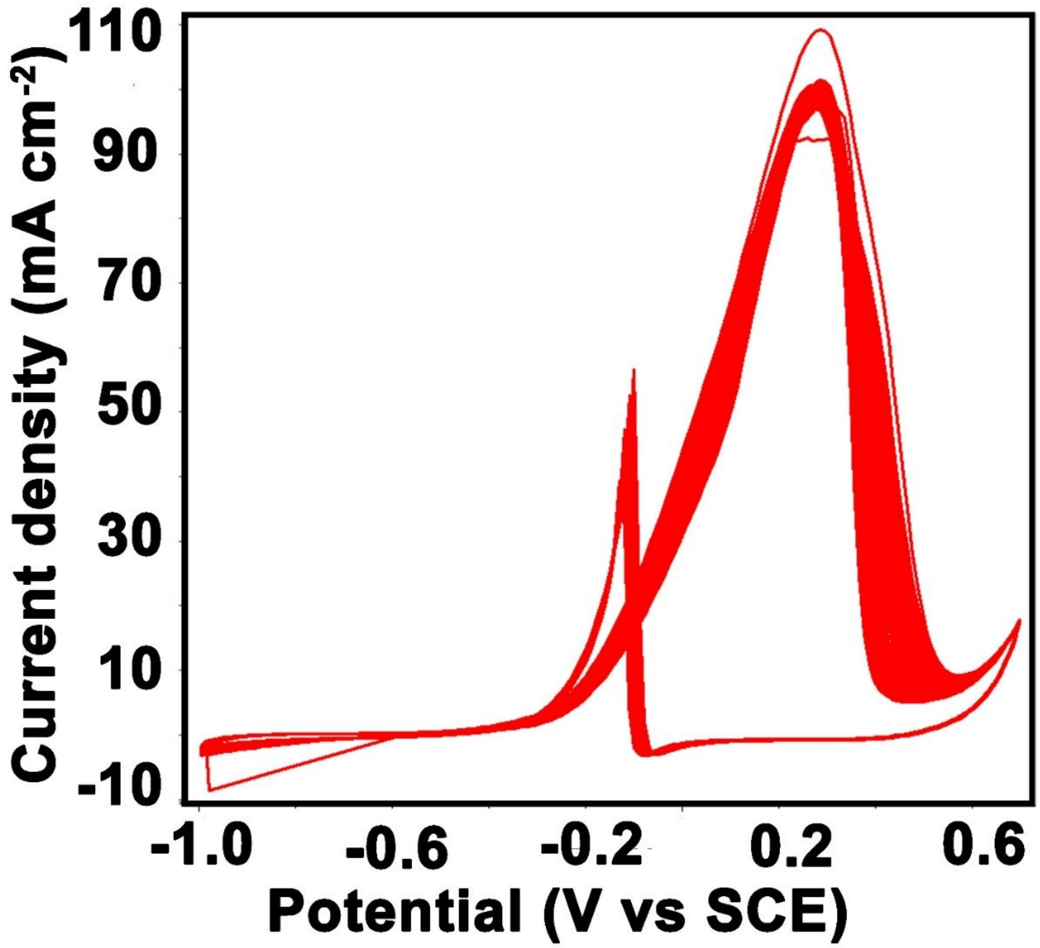

Figure S9. Cyclic voltammograms for 100 cycles obtained for Pd/rGO and PdCa/rGO 0.5 M KOH solution and 0.5 M ethanol solution.

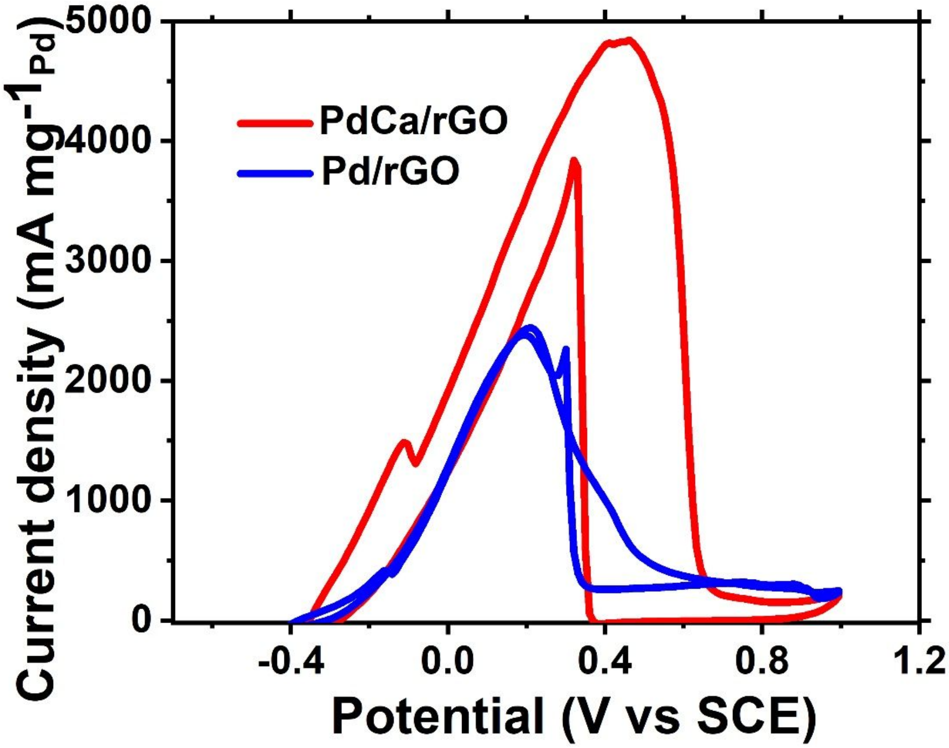

Figure S10. Cyclic voltammograms (mass specific activity) obtained for Pd/rGO and PdCa/rGO 0.5 M $KClO_4$ solution and 0.5 M formic acid solution.

Table S1. Elemental Composition of PdCa/rGO from EDX

Element	Line Type	Apparent Concentration	k Ratio	Wt%
C	K series	17.38	0.17384	50.02
O	K series	6.27	0.02108	24.14
Ca	K series	2.35	0.02099	5.48
Pd	L series	7.26	0.07257	20.35
Total:				100.00

Table S2: ICP-MS analysis Data

Element	Wavelength	Wt%
Ca	317.933	6.42
Pd	340.458	20.6

Table S3: Surface Area Analysis

Material	BET Surface Area m^2/g	Langmuir Surface Area m^2/g	BJH Pore Volume (cm^3/g)	BET Pore Size (Å)
Ca/rGO	10.84	34.99	0.042	54.12
PdCa/rGO	40.62	272.90	0.16	88.33