

Combining voltammetry with HPLC: application to electro-oxidation of glycerol

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List of supporting information:

- Figure S1.
- Figure S2.
- Figure S3.
- Figure S4.
- Table S1.

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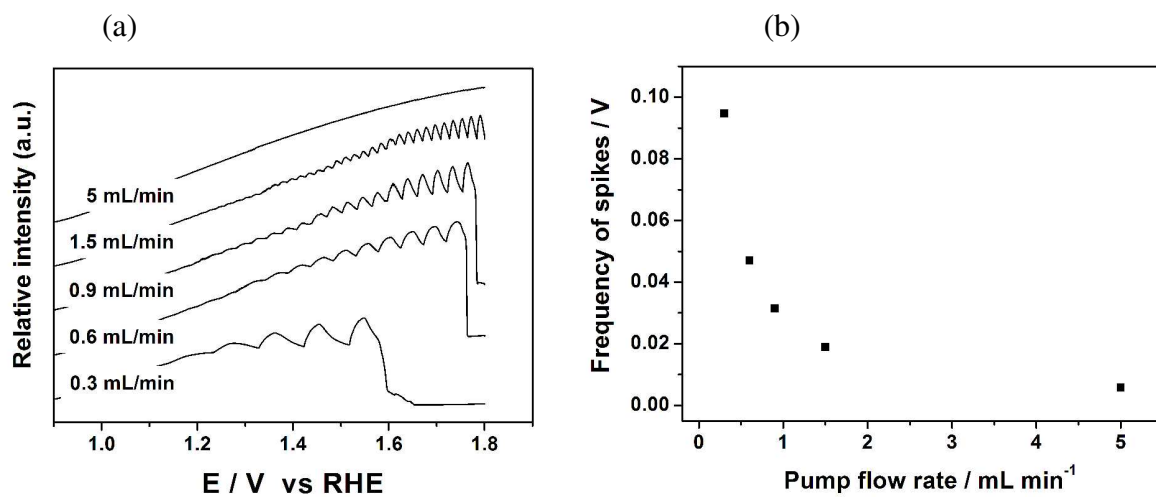
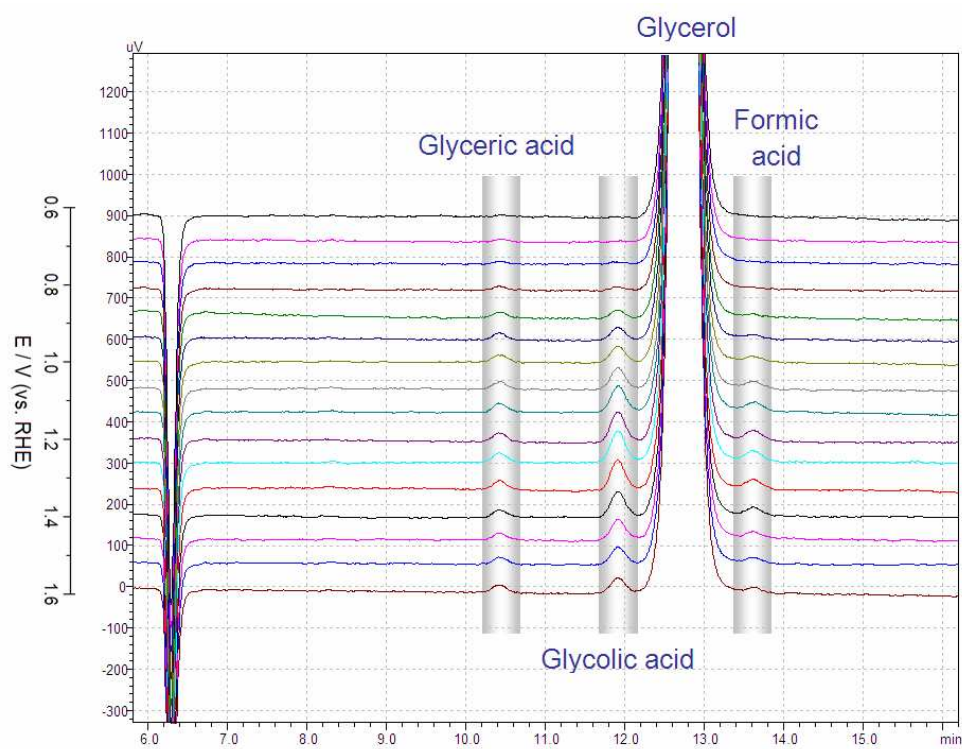


Figure S1. The relationship between pump flow rate of sample collection and frequency of spikes during glycerol oxidation on Au electrode. Scan rate is 10 mV/s.

(a)



(b)

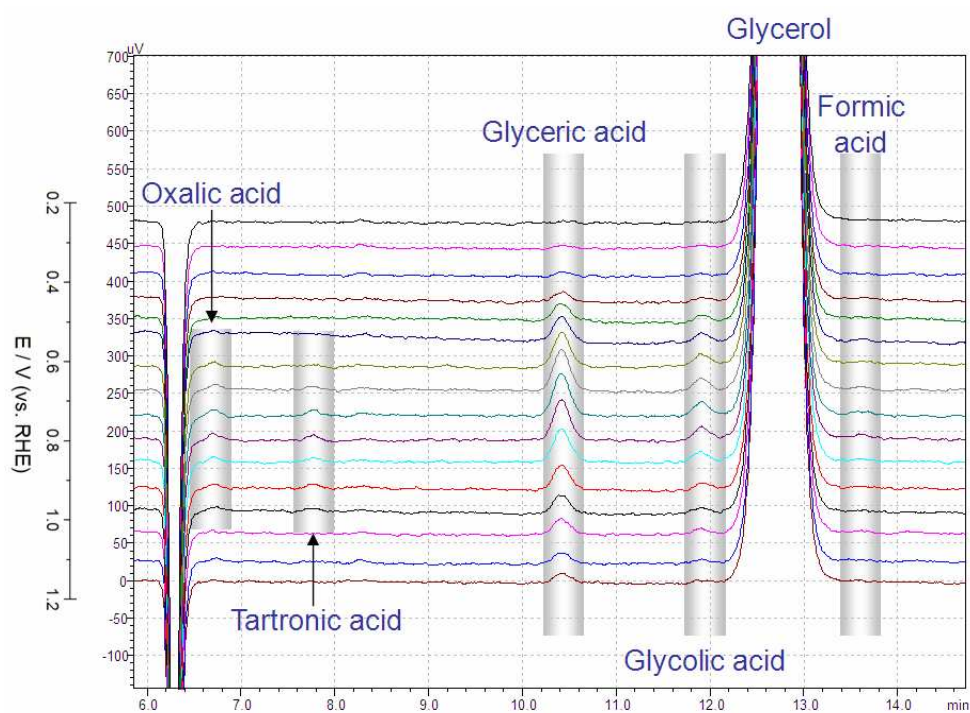
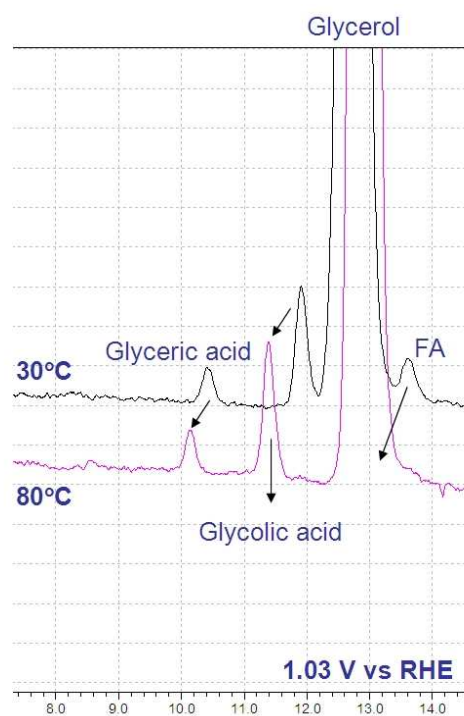


Figure S2. Chromatograms from HPLC analysis at 30°C with collected samples during voltammetry on (a) Au and (b) Pt electrodes.

(a)



(b)

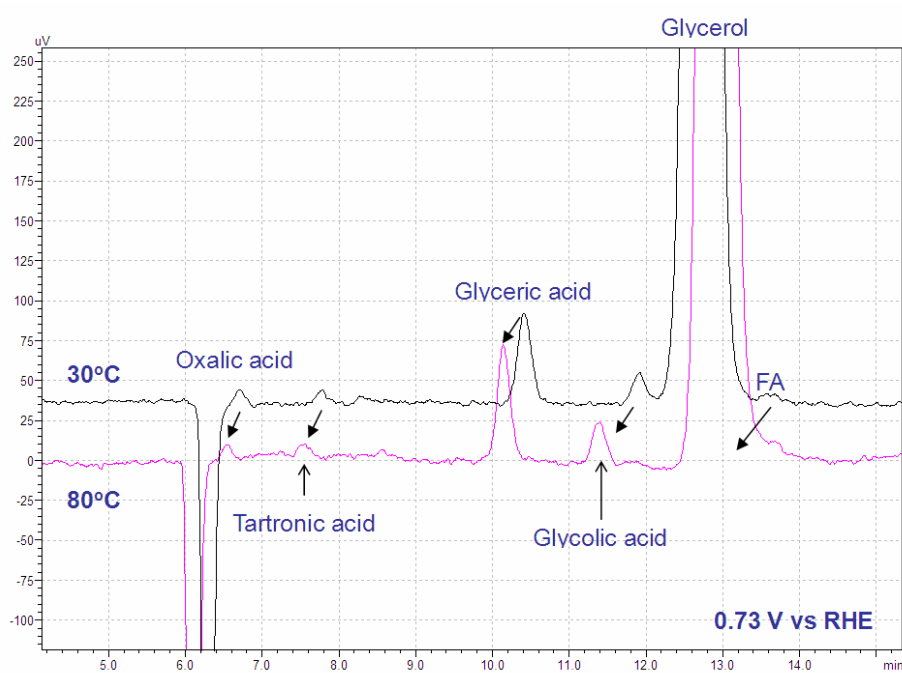
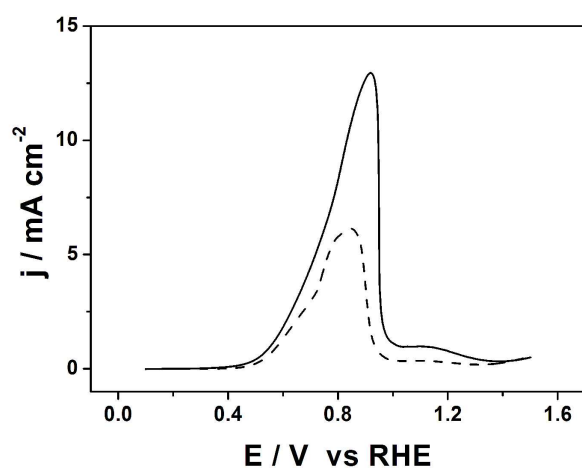


Figure S3. Chromatograms from HPLC analysis at 30°C and 80°C to separate, especially glyceric acid and glyceraldehyde on (a) Au and (b) Pt electrodes.

(a)



(b)

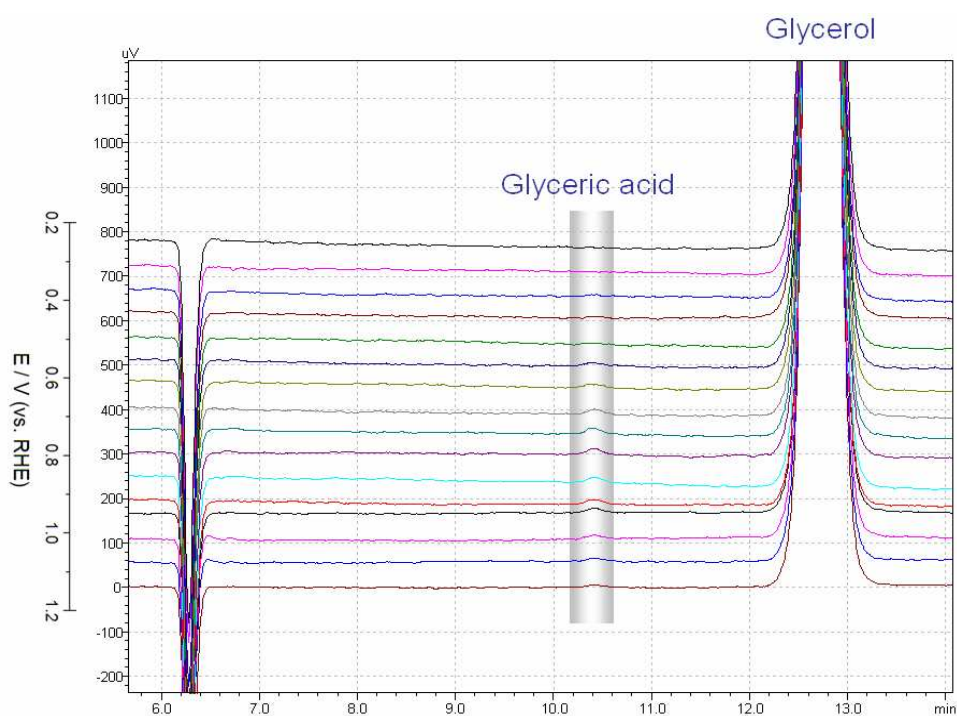


Figure S4. Effect of high scan rate (10 mV/s) and sample collecting flow rate (0.6 $\mu\text{L}/\text{min}$) on (a) the current density during linear sweep voltammetry on Pt electrode and (b) chromatograms at 30°C. Scan rate and flow rate of sample collection are 1 mV/s with 0.06 $\mu\text{L}/\text{min}$ (dashed line) and 10 mV/s with (solid line), respectively. Especially, (a) charges transferred during glycerol oxidation on 1 and 10 mV/s are 2.936×10^{-1} C and 5.912×10^{-2} C, respectively, therefore only ca. 20 % of glycerol oxidation products can be collected with 10 mV/s compared to 1 mV/s. To confirm this, (b) the concentration of glyceric acid at 0.79 V (RHE) is 0.151 mM, which is ca. 24 % of glyceric acid in Figure S2 at the same potential.

Table S1. Retention time of glycerol oxidation products at 30°C and 80°C

Chemical	Retention time (min)	
	30°C	80°C
Oxalic acid	6.694	6.533
Tartronic acid	7.765	7.534
Glyceric acid	10.414	10.138
Glyceraldehyde	10.475	11.063
Glycolic acid	11.904	11.386
Glycerol	12.725	12.892
Formic acid	13.611	12.916