Electronic Supplementary Information for

# Electrochemical growth of $Co(OH)_2$ nanoflakes on Ni foam for methanol electro-oxidation

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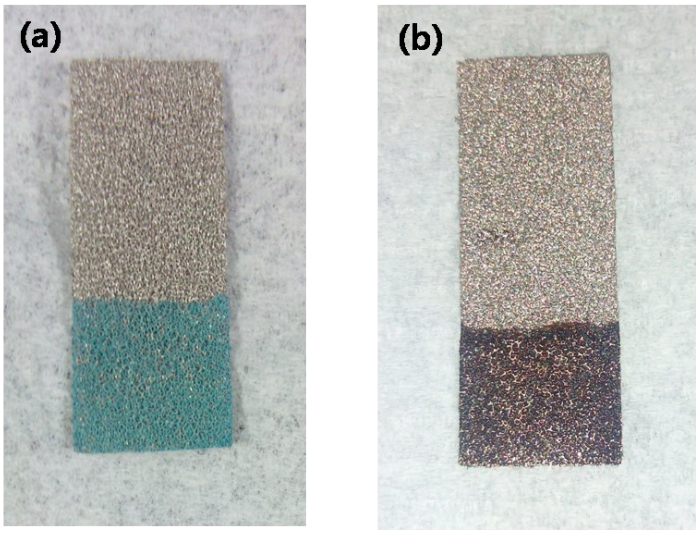


**Figure S1:** Photographs of the as electrodeposited (a) $Co(OH)_2$ and (b) $Co_3O_4$ films on Ni foam

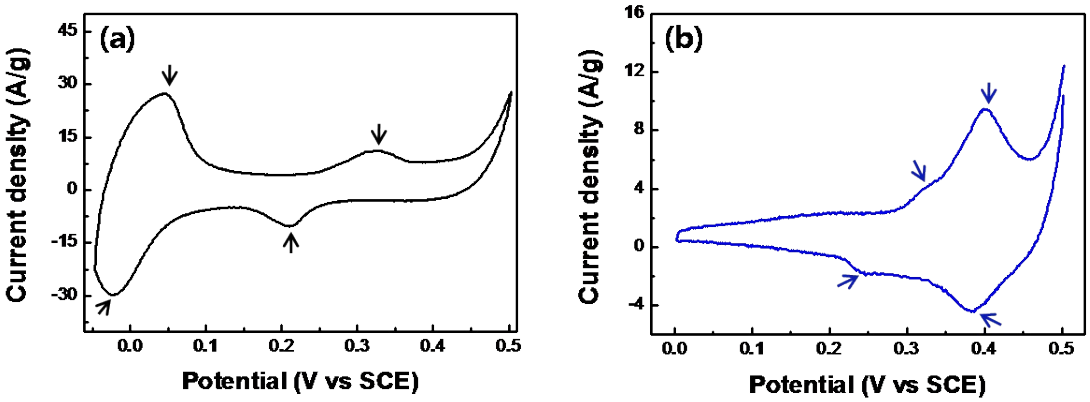


**Figure S2:** CV of the (a) $Co(OH)_2$ and (b) $Co_3O_4$ electrodes at the scan rate of 10 mV/s in 1M KOH solution

**Table S1:** Comparison of different electrocatalysts for methanol oxidation application

| No. | Catalyst | Method | Electrolyte (M) | Potential range (V) | Scan rate (mV/s) | Onset potential (V) | Current density | Cycling stability | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 1 | $NiCo_2O_4$ | Electrodeposition | 1M KOH+ 0.5M Methanol | 0-0.6 | 10 | 0.42 | 52 A/g | 82% retention after 1000 cycles | 4 |
| 2 | $Cu(OH)_2$ | In-situ surface chemical oxidation | 1M KOH+ 0.5M Methanol | 0-0.6 | 10 | 0.40 | 55 A/g | NA | 5 |
| 3 | $Co_3O_4$/NiO core/shell nanowire | Hydrothermal+ Electrodepostion | 1M KOH+ 0.5M Methanol | 0.1-0.75 | 25 | 0.45 | 145 $mA/cm^2$ | Stable after 500 cycles | 15 |
| 4 | $MnCo_2O_4$ | Co-precipitation | 1M KOH+ 0.5M Methanol | 0-0.5 | 10 | NA | 79.9 A/g | 80% retention after 500 cycles | 17 |
| 5 | $ZnCo_2O_4$ | Hydrothermal | 1M KOH+ 0.5M Methanol | 0-0.8 | 10 | 0.50 | 105 A/g | 65% retention after 1000 cycles | 44 |
| 6 | $Co(OH)_2$ | Electrodeposition | 1M KOH+ 0.5M Methanol | 0-0.5 | 10 | 0.27 | 150 A/g | 82% retention after 500 cycles | Present work |