Nickel Gallium Intermetallic Compounds derived from Layered Double Hydroxides for Electrochemical CO2 Reduction

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CO2 Reduction is a useful technique for reutilization of CO2 and sustainable fuel production. Ni element has a catalytic ability for CO2 conversion into useful fuel, but it has a drawback in low CO2 adsorption sites and imperfect electrical binding strength of CO2. On the other hand, Ni based alloy, for instance Ni-Ga intermetallic compounds(IMCs), has shown the desired catalytic property in multiple CO2 activation sites and modified its electrical binding strength. Furthermore, two-dimensional layered double hydroxides(LDHs; [M2+ 1-xM3+ x(OH)2]x+ (An-)x/n·mH2O) , where M is divalent metal cation or trivalent metal cation and A is charge-balancing anion has been expected strong capacity for CO2 adsorption in the interlayer space. By using LDHs as precursor for intermetallic compounds, as-prepared nanostructured IMCs will be expected to have high surface area and other catalytic properties. Herein, Nickel Gallium Intermetallic Compounds(NiGa-IMCs) derived from NiGa-LDHs was suggested for electrochemical CO2 conversion and its physicochemical characteristics and catalytic performances were evaluated.