

Electrochemical reduction of Ni(OH)<sub>2</sub> in KOH medium at different electrodes towards full electrochemical cell

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A stable homogenous mediators are the current need for mediated electrochemical reduction/oxidation to minimize the complexities. In light of many mediators, free metal ions like Ag(II), Ce(IV), and Co(III) are highly energetic for complete oxidation of environmental pollutants. But, low valent state of metal ions stability upon reduction is a key factor to use the metal ions like Co(I), Cu(I), and Ni(I) in the reduction process. Among many ways to stabilize the low valent metal ions, electrolyte concentration variation itself acts as a stabilizer in many situations. Here, redox behavior of Ni(OH)<sub>2</sub> studies planned to investigate using cyclic voltammetry analysis. Through the redox behavior, one can say whether the low valency of metal ions stabilized. Further, full electrochemical cell operation started using CoSO<sub>4</sub> and Ni(OH)<sub>2</sub> for oxidant and reductant, respectively. By applying constant current, one can measure the oxidation/reduction efficiencies of the respective species by monitoring ORP (oxidation reduction potential) change. To support the cyclic voltammetry and electrolysis results, SEM and XRD analyses of the electrodes adopted. Finally, there will be a discussion on stabilization of CoSO<sub>4</sub> and Ni(OH)<sub>2</sub> oxidation and reduction simultaneously.