

Metal complex and suitable electrode pair in ionic liquid pave the way for galvanostatic electrolysis by minimizing the electrode decay

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Electrode dissolution in ionic liquid medium during constant current electrolysis restricts to use in many industrial applications. Keeping this in mind, use of metal complex in ionic liquid can be a good choice to control the electrode dissolution by control the potential window. In the present work, constant current electrolysis were performed in presence and absence of $\text{Co}(\text{CN})_5^{3-}$ to understand the electrode dissolution effect in 1-Butyl-3-Methylimidazolium HexafluoroPhosphate (BMIHFP) ionic liquid. Initial CV analysis in presence of $\text{Co}(\text{CN})_5^{3-}$ using Pt electrode found shortened the potential window of the BMIHFP ionic liquid. Constant current electrolysis was performed with and without $\text{Co}(\text{CN})_5^{3-}$ using different pairs of electrodes such as Pt-Pt, Graphite-Pt, Graphite-Graphite, Graphite-DSA, Graphite-BDD and monitored the electrode dissolution by UV-Visible and ICP-OES. Graphite-BDD electrodes pair found no dissolution at 5 mA cm^{-2} current density with $\text{Co}(\text{CN})_5^{3-}$.