



ELECTROCHEMICAL SEPARATION OF FERRO/FERRICYANIDE USING A MEMBRANE FREE REDOX FLOW CELL

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Abstract:

Different configurations (Perspex and PTFE) of a membrane free flow cell containing equimolar concentrations of the ferro/ferricyanide redox couple in potassium carbonate electrolyte with porous electrodes have been studied in this work. The optimum combination of parameters such as concentration, cell potential and electrolyte flow rate have been analysed and compared with a flow cell described in the literature. It was observed that if Perspex cells were empty at the start of the experiment then the conversion obtained was more consistent with the literature. When a PTFE flow cell was used, the conversions were poor in comparison to the Perspex cell with the same electrode area. It was thought that due to the strong hydrophobic nature of PTFE, only a fraction of the electrode area was used in the separation. In addition, the electrode gap was bigger for the PTFE cell in comparison to the Perspex reactor. The highest conversion obtained with the PTFE flow cell was about 62%; much less than the conversions obtained with the Perspex cell. The Perspex cell is recommended for investigations with aqueous redox couples whereas the PTFE flow cell will require characterization with organic ferrocene redox species before meaningful conclusions are drawn.

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