Influence of water content on properties of a heterogeneous bipolar membrane

David Neděla, Jan Křivčík, Robert Válek, Eliška Stránská, Jaromír Marek

ABSTRACT

The heterogeneous ion-exchange membranes consist of polymer matrix and ion-exchange resin powder. The goal of this work was to compare two types of the heterogeneous bipolar membranes made of powdered ion-exchange resin with different water content. The water content influences the resistance of layers and the kinetics of water dissociation. The properties of heterogeneous bipolar ion-exchange membranes were compared due to the current–voltage curve. The evaluated parameters are the limiting current density, the efficiency of the water dissociation, and the resistance below the potential for water splitting. Finally, the bipolar membranes were tested in the electrodialysis stack. The membranes with higher water content had about 25% higher performance at the stack.

Keywords: Heterogeneous bipolar membrane; Ion-exchange resin; Current–voltage curve; Electrodialysis