



Hydrolysis of sucrose by radiation grafted sulfonic acid membranes

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Abstract

The hydrolysis of sucrose to glucose and fructose by poly(tetrafluoroethylene-co-perfluorovinyl ether)-graft-polystyrene sulfonic acid (PFA-g-PSSA) membranes was investigated. The membranes were prepared by simultaneous radiation-induced grafting of styrene onto poly(tetrafluoroethylene-co-perfluorovinyl ether) (PFA) films using γ -radiation followed by sulfonation with chlorosulfonic mixture. The kinetics of the reaction was determined for various membranes in batch mode and the reaction rate constants were obtained in a temperature range of 40–70 °C. The catalytic activity of the membranes was found to be dependent on the reaction temperature and the concentration of the sulfonic acid groups in the membranes. The results of this work suggest that PFA-g-PSSA membranes have strong potential to replace liquid sulfuric acid and ion exchange resins in sugar hydrolysis processes.

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