

## **Sulfonasi Film cPTFE Tercangkok Stirena untuk Membran Penghantar Proton Sel Bahan Bakar**

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### **Sulfonation of cPTFE Film grafted Styrene for Proton Exchange Membrane Fuel Cell.**

Sulfonation of  $\gamma$ -ray irradiated and styrene-grafted crosslinked polytetrafluoroethylene film (cPTFE-g-S film) have been done. The aim of the research is to make hydrophilic membrane as proton exchange membrane fuel cell. Sulfonation was prepared with chlorosulfonic acid in chloroethane under various conditions. The impact of the percent of grafting, the concentration of chlorosulfonic acid, the reaction time, and the reaction temperature on the properties of sulfonated film is examined. The results show that sulfonation of surface-grafted films is incomplete at room temperature. The increasing of concentration of chlorosulfonic acid and reaction temperature accelerates the reaction but they also add favor side reactions. These will lead to decreasing of the ion-exchange capacity, water uptake, and proton conductivity but increasing the resistance to oxidation in a perhidrol solution. The cPTFE-g-SS membrane which is resulted has stability in a  $H_2O_2$  30% solution for 20 hours.

*Keywords:* proton exchange membrane, sulfonation, chlorosulfonic acid, cPTFE film