

# **RADIATION-INDUCED GRAFTING OF STYRENE ONTO POLY(VINYLLIDENE FLUORIDE) FILM AT LOW DOSES**

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## **ABSTRACT**

Studies about grafting of monomers in fluorinated polymers attract more interest due to production of ion-exchange membranes for use in fuel cells or polymeric actuators and in both cases the polymer must to exhibit ion exchange capacity. Grafting is one step to achieve ion exchange polymeric membranes and radiation-induced grafting is one way to obtain a grafted polymer, however, fluorinated polymers are very sensible to ionizing radiation. Therefore, it is important to develop radiation-induced grafting process using doses as low as possible. This paper aims to present results of radiation-induced grafting of styrene onto poly(vinylidene fluoride) (PVDF) films with 0.1 mm thickness using gamma rays from a Co-60 source with dose rate of 5 kGy h<sup>-1</sup> at doses of 1 and 2.5 kGy by simultaneous method with a styrene/N,N-dimethylformamide (DMF) solution (1:1, v/v), under nitrogen atmosphere and at room temperature. The films were characterized before and after modification by FT-IR (Infrared Spectroscopy), Differential Scanning Calorimetry (DSC), Thermogravimetric measurements (TG) and the degree of grafting (DOG) were calculated. DOG results shows that grafting increases with dose, and it was possible to confirm the grafting of styrene by FT-IR due to the appearance of new characteristics peaks and by the TG and DSC due to changes in thermal behavior of the grafted material. Results showed that the system allows the controlled grafting of styrene onto PVDF using gamma irradiation at doses as low as 1 kGy.

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