

Radiation grafting of styrene/divinylbenzene onto PP film.

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The radiation-induced graft of monomers onto polymeric films is a very effective method to obtain proton-exchange membranes (PEMs) for polymer electrolyte fuel cells (PEFCs) applications. In this work, the influence of the synthesis conditions on radiation-induced grafting of styrene/divinylbenzene (S/DVB) onto polypropylene (PP) film was investigated by a simultaneous irradiation technique using γ -rays from a Co^{60} source. The grafting solution was prepared with toluene as solvent, S as monomer and DVB as crosslinker. The degree of grafting (DOG) for the films was evaluated by varying the irradiation dose (40, 60 and 80 kGy) and the ratio of reactional system:solvent, S/DVB:toluene, used was 1:4; 1:1 and 4:1 (v/v). It was observed that the DOG increases with increase in the irradiation total dose for all monomer concentration. The effect of the S/DVB:toluene mixture on the DOG shows that the maximum degree of grafting, 61%, was achieved for a mixture with a composition of 4:1. By means of the FT-IR and TG measurements, it was evident that the monomer and the crosslinker were grafted into the PP film.

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