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Controlled development of pores in polyethylene terepthalate sheet by room temperature chemical etching method

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Abstract

In the present work, a room temperature chemical etching (RTCE) method has been explored for controlled development of pores in the chlorine ions (115 MeV) bombarded polyethylene terepthalate (PET) (25 μm) sheets. In this pore development method, a mixture of ethanolamine and NaOH is employed. The pore-size distributions in thus formed PET track-etched membranes have been obtained by the capillary flow porometry, and compared with the results of PET track-etched membranes subjected to widely used chemical etching (CE) at elevated temperature. Multiple pore size distributions have been observed with the CE method. However, with RTCE, pores with single narrow pore size distribution have been observed. To further improve the RTCE method, the chlorine ions bombarded PET sheets have been sensitized with UV radiation (254 nm) for 1 h, and subjected to RTCE. The average pore-size has been found to increase with UV-sensitization without affecting the nature of pore-size distribution, indicating the possibility of formation of the track-etch membranes with different pore sizes. Track etching studies show