

Diode-like single-ion track membrane prepared by electro-stopping

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The preparation of an asymmetric membrane in poly(ethylene terephthalate) (PET) is described, using a combination of chemical and electro-stopping. For this purpose, a single-ion-irradiated PET film is inserted into an electrolytic cell and etched from one side in 9 M sodium hydroxide while bathing the other side in a mixture of 2 M KCl and 2 M HCOOH (1:1 by volume), electrically retracting the OH⁻ ions from the tip of the etch pit during pore break-through. When a preset current has been reached, the etch process is interrupted by replacing the etching solution with acidic 1 M potassium chloride solution. After etching, the current-voltage (*I-V*) characteristic is determined under symmetric bathing conditions, immersing both sides of the membrane in KCl solutions of identical concentration (0.01-1 M) and pH (3-8). The *I-V* characteristic is strongly non-linear, comparable to that of an electrical diode. If the polarity during etching is reversed, pushing the OH⁻ ions into the tip of the etch pit, the resulting pores are larger and the degree of asymmetry smaller. The importance of electro-stopping is compared with chemical stopping.