

## **Application of ion beams to synthesis of environmentally responsive track membranes**

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Ion beams with an energy of 10 MeV/n were used for producing porous membranes of poly(ethylene terephthalate) and poly(diethyleneglycol-bis-allylcarbonate) films. The condition to obtain cylindrical pores was explained by the relation between the relative etching rate and restricted energy transfer from ion beams to polymer films. The porous membranes were chemically modified either by copolymerizing or by grafting such hydrogel monomers as *N*-isopropylacrylamide and acryloyl-L-proline methyl ester. The obtained membranes changed pore size in response to the change in environmental conditions such as temperature. The change was followed by electron microscopy. A cyclic change in conductivity of potassium ion through the membrane of a single pore was observed when the temperature of the dialysis cell containing a 0.1 M KCl solution was cycled between two temperatures. The selectivity of organic ion passing through the membrane drastically changed at the phase transition temperature of the attached hydrogel layer.