Ion transport through asymmetric nanopores prepared by ion track etching

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Transport properties of single asymmetric nanopores in polyethylene terephthalate (PET) and polyimide (Kapton) membranes are investigated. The pores are produced by the track-etching technique based on irradiation of the polymer with heavy ions and subsequent chemical etching. Electrolytic conductivity measurements show that asymmetric pores in both polymeric materials rectify the ionic current. The PET and Kapton pores differ however significantly in their transient transport properties. The ion current through the PET nanopore fluctuates with the amplitudes reaching even 100% of the mean current, whereas nanopores in Kapton exhibit a stable current signal. We show that the transient properties of the pores depend on the chemical structure of the polymer as well as on the irradiation and etching procedures used in this work.