

技术及应用

## 纳米孔径重离子微孔膜的制备

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**摘要** 应用中国原子能科学研究院HI 13串列加速器产生的重离子  $^{32}\text{S}$  和  $^{79}\text{Br}$  轰击聚对苯二甲酸乙二醇酯 (PET) 薄膜, 再对薄膜进行化学蚀刻处理使由重离子辐照损伤产生的潜径迹形成微孔, 制备出孔径为100~900 nm的重离子微孔膜。为增加径迹蚀刻速率与体蚀刻速率之比, 化学蚀刻前采用紫外光辐照薄膜。蚀刻过程中采用电导蚀刻法监测膜孔径生长过程。对  $^{32}\text{S}$  和  $^{79}\text{Br}$  辐照制备的重离子微孔膜进行了比较,  $^{79}\text{Br}$  离子辐照制备的微孔膜与  $^{32}\text{S}$  离子辐照制备的微孔膜相比, 孔型圆整, 锥角更小; 在制备纳米微孔膜方面  $^{79}\text{Br}$  离子优于  $^{32}\text{S}$  离子。

**关键词** [重离子](#) [纳米微孔膜](#) [聚对苯二甲酸乙二醇酯](#) [电导蚀刻法](#)

分类号

## Fabrication of Nanoporous Heavy-Ion Track-Etched Membranes

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**Abstract** Polyethylene terephthalate membranes were irradiated by  $^{32}\text{S}$  and  $^{79}\text{Br}$  ions produced by HI 13 tandem accelerator in CIAE. The polymer chains were damaged by the irradiation, and latent tracks were created along the track of the ions. Nanoporous membranes with diameters between 100 and 900 nm were obtained by chemical etching the membranes. To increase the ratio of the velocities of the track etching to the body etching, the membranes were illuminated by ultraviolet light before chemical etching. The conductance measurement was applied to monitor the growing of the pores. The cone angle of pores in membranes irradiated by  $^{79}\text{Br}$  is smaller than that by  $^{32}\text{S}$ . The pores in the membrane irradiated by  $^{79}\text{Br}$  are also more round and uniform in size than that by  $^{32}\text{S}$ .  $^{79}\text{Br}$  ions are better than  $^{32}\text{S}$  ions in making nanoporous membranes.

**Key words** [heavy-ion](#) [nanoporous](#) [membrane](#) [polyethylene](#) [terephthalate](#) [conductance measurement](#)

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