

## Thermal control of drug release by a responsive ion track membrane observed by radio tracer flow dialysis

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The combination of a responsive hydrogel with a rigid porous supporting structure yields a membrane with high mechanical strength and high on-off-permeability ratio.

A membrane consisting of an ion track filter with a thermally responsive lining was prepared by penetrating a 19  $\mu\text{m}$  thick foil of poly(ethylene terephthalate) (PET) with swift heavy ions at a fluence of  $5\text{-}10^5$  ions/cm<sup>2</sup>, followed by etching of the ion tracks to generate an ion track filter with 2.9  $\mu\text{m}$  pore diameter, onto which a thin layer of poly(*N*-isopropylacrylamide) (NIPAAm) hydrogel was grafted. It was revealed that the mass flow of various molecules (water, chloride<sup>-</sup>, choline<sup>+</sup>, insulin, and albumin) through the membrane could be thermally controlled.

The on-off-permeability ratio ranged between 3 and 10 increasing with molecular weight. Over a storage time of 5 months the permeabilities varied up to a factor of 2.6, while the on-off-permeability ratio and temperature sensitivity remained practically constant.