

Ni nanowires electrodeposited in single ion track templates

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30- μm thick polycarbonate foils were irradiated with single swift heavy ions (e.g. Au 11.4 MeV/nucleon). After etching with solutions containing NaOH and methanol, templates containing single conical pores were obtained. The size and the shape of the nanopores depend on etching conditions such as time of etching, concentration and temperature of the etching solution. By electrochemical deposition of nickel, nanowires were grown in the single pores. The nanowires were contacted by sputtering a gold layer on top of the membrane. The magnetic measurements indicated that the nanowires possess around 1% anisotropic magnetoresistance. The current-voltage characteristic of a Ni nanowire shows a linear behavior for current densities smaller than 10^8 A/cm². The maximum current density that a single Ni wire can withstand was found to be 3×10^8 A/cm².