

An asymmetric polymer nanopore for single molecule detection

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We describe a sensor capable of detecting single DNA molecules. The sensor is based on a single nanopore prepared in a polymer film by a latent ion track-etching technique. For this purpose, a polymer foil was penetrated by a single heavy ion of total kinetic energy of 2.2 GeV, followed by preferential etching of the ion track. DNA molecules were detected as they blocked current flow during translocation through the nanopore, driven by an electric field. The nanopores are highly stable and their dimensions are adjustable by controlling etching conditions. For detecting DNA, conical nanopores with opening diameters of 2 μm and 4 nm were used. The nanopore sensor was able to discriminate between DNA fragments of different lengths