## Ion-Track Nanotechnology: from bio-inspired nanopores to 3D nanowire networks for energy applications

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This presentation focuses on current activities on ion-track nanotechnology. On their way through matter, swift heavy ions with GeV energy deposit enormous energy densities along their trajectory, causing long nanoscopic damage trails known as ion tracks. By ion irradiation of polymer foils at several incident angles in consecutive steps, followed by chemical etching, tailored polymer membranes with single nanochannels and channel arrays, either parallel or tilted at various angles, are produced. Nanochannel density, diameter, and geometry are adjusted by the irradiation and etching conditions, respectively. Subsequent electrodeposition in the nanochannel network results in highly ordered 3-D nanowire ensembles. Several examples will illustrate the design and study of nanopore-based sensors [1,2] and how electrodeposition and ion-track nanotechnology provide an excellent platform for developing unique free-standing three-dimensional nanowire assemblies as well as for studying their size-dependent properties [3-5]. The arrangement of nanowires into stable 3-D architectures enables their implementation, e.g., for thermoelectric, catalytic, or sensing applications.



## References

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