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Nanochannels, nanowires, and nanotubes fabricated by ion-track nanotechnology

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This talk will illustrate how swift heavy ion-track nanotechnology provides an excellent platform (i) to fabricate tailored nanochannel sensors, (ii) to fabricate nanowires and investigate their size-dependent properties, and (iii) to develop 3-D and multicomponent nanostructure assemblies.

Membranes with parallel nanochannels are fabricated by swift heavy ion irradiation and subsequent chemical etching. In addition, templates with interconnected tilted nanochannels are obtained by applying ion irradiation at several incident angles in consecutive steps. Nanochannel density and orientation, as well as diameter and geometry, are adjusted by the irradiation and etching conditions, respectively. Subsequent electrodeposition in the channels results in nanowire arrays and highly ordered 3-D nanowire ensembles of various materials. Recent developments achieved on the electrodeposition of metal (Au, Cu), semiconductor (ZnO and p-Cu₂O) and semimetal (Sb) nanowire arrays and nanowire networks will be also presented.

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