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# AuAg alloy and porous Au nanowires and nanowire networks created by electrodeposition in ion-track etched polymer templates for plasmonic applications

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Metallic nanowires have great potential for future plasmonic applications. By varying nanowire dimensions, composition, shape and morphology, their plasmonic resonance frequency and near field characteristics can be tuned for specific sensing functions in the infrared and visible light range. For their implementation as sensors, however, two main challenges are being tackled: (i) the nanostructures plasmonic performance must be understood and optimized and (ii) stable and complex assemblies of nanowires such as networks and arrays must be developed.
In this overview, we demonstrate how ion-track nanotechnology combined with electrochemical deposition allows the tailored synthesis of complex structures including three dimensional interconnected nanowires. Moreover, the deposition of special AuAg alloy wires is presented with Au:Ag concentrations tailored by varying the synthesis parameters. Chemical dissolution of the Ag content produces wires and mechanically stable networks of high porosity. The tremendously increased effective surface is of great interest for providing plasmonic hotspots. Compared to smooth nanowires, highly porous Au nanowires show a red-shift of their plasmon resonance frequency as demonstrated by electron energy-loss and infrared spectroscopy.

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