Surface plasmon resonances of Cu nanowire arrays

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Surface plasmon resonances of arrays of parallel copper nanowires, embedded in ion track-etched polycarbonate membranes, were investigated by systematic changes of nanowires' topology and arrays area density. The extinction spectra exhibit two peaks which are attributed to interband transitions of Cu bulk metal and to a dipolar surface plasmon resonance, respectively. The resonances were investigated as a function of wire diameter and length, mean distance between adjacent wires, and angle of incidence of the light field with respect to the long wire axis. The dipolar peak shifts to larger wavelengths with increasing diameter and length, and diminishing mean distance between adjacent wires. Additionally, the shape effect on the dipolar peak is investigated.