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Synthesis and modelling of the mechanical properties of Ag, Au and Cu nanowires

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The recent interest to nanotechnology aims not only at device miniaturisation, but also at understanding the effects of quantised structure in materials of reduced dimensions, which exhibit different properties from their bulk counterparts. In particular, quantised metal nanowires made of silver, gold, copper or nickel have attracted much attention owing to their unique intrinsic and extrinsic length-dependent mechanical properties. Here we review the current state of art and developments in these nanowires from synthesis to mechanical properties, which make them leading contenders for next-generation nanoelectromechanical systems. We also present theories of interatomic interaction in metallic nanowires, as well as challenges in their synthesis and simulation.

Keywords: coinage metal nanowires; synthesis method; molecular modelling; nanotechnology