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Structural analysis of Ni3Si2 by EDT and dynamical refinement

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Transition metal silicides are known for properties such as low resistivity, high melting point, low cost and low toxicity, which are of great interest for applications in current silicon nanotechnology such as nano-complementary metal-oxide semiconductor (CMOS) devices, photovoltaics and ohmic contacts. In all these technologies the materials are used on nanoscale. To gain better insight into their properties, it is necessary to be able to determine the structure of the nanoparticles of these materials. Electron diffraction tomography combined with the precession electron diffraction (PED) are ideal techniques for structural analysis of nanocrystals. In this work Ni3Si2 nanowires with diameter of 15 nm were analyzed by EDT both with and without PED. The structure was refined using the kinematical and dynamical diffraction theory. The results show that the best results can be obtained of EDT and PED.

Keywords: Dynamical refinement, Precession electron diffraction, Nickel silicide