Strain distribution in single, suspended germanium nanowires studied using nanofocused x-rays

Within the quest for direct band-gap group IV materials, strain engineering in germanium is one promising route. We present a study of the strain distribution in single, suspended germanium nanowires using nanofocused synchrotron radiation. Evaluating the probed Bragg reflection for different illumination positions along the nanowire length results in corresponding strain components as well as the nanowire’s tilting and bending. By using these findings we determined the complete strain state with the help of finite element modelling. The resulting information provides us with the possibility of evaluating the validity of the strain investigations following from Raman scattering experiments which are based on the assumption of purely uniaxial strain.

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