The effect of chemical doping on a lattice parameter of InP.

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InP is widely used substrate for the epitaxial growth of high-performance electronic and photonic devices [1]. Although the measurements of a lattice parameter in InP were previously reported [2], and various technical aspects of X-ray diffraction measurements were discussed since 1930 [3], there remains an ambiguity concerning the effect of chemical doping at a level of $5x10^{18}$ cm^{-3} on a lattice parameter and its distribution in bulk single crystals grown to be used as substrate materials.

Here we present results of extensive X-ray diffraction measurements performed on VGF single crystals and powder samples of InP doped with S, Fe and other elements. We systematically study the effect of doping on lattice parameter and discuss influence of dopants on a facetted crystal growth and a formation of defects. We also compare the results to GaAs and other $A^{III}B^{V}$ semiconducting materials.

References

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