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Elastic Constants and Related Mechanical Properties of $Y_xIn_{1-x}N$ Ternary System

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Using a pseudo-potential approach within the virtual crystal approximation, the elastic properties of $Y_xIn_{1-x}N$ semiconductor ternary alloys in the hypothetical zinc-blende phase have been investigated. The results obtained for InN show a reasonable agreement with data available in the literature. Other case, our findings are the first predictions for alloys in question. The composition dependence of all features being considered in the present contribution for the material of interest has been analyzed and discussed. Our results have shown that the elastic constants and their related parameters for $Y_xIn_{1-x}N$ decrease monotonically with increasing the yttrium concentration x. The information derived from the present study may be useful for $Y_xIn_{1-x}N$ compositional characterization.

Keywords: elastic constants, mechanical properties, $Y_xIn_{1-x}N$ alloys, pseudo-potentials.