

40K superconductivity of hole doped blue phosphorene; A density functional study

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Abstract:

We theoretically explore a quite high temperature superconductivity of hole doped blue phosphorene within the density functional theory simulations. We show that for a hole doped blue phosphorene, owing to the quite strong electron-phonon coupling, isotropic superconducting state is induced. The theory is based on the Migdal-Eliashberg formalism and the critical temperature is obtained through set-of-equations self-consistency. Although the inclusion of the vertex corrections beyond the Migdal-Eliashberg formalism reduces the critical temperature, our accurate numerical results show that the critical superconducting temperature is still quite high.