Superconductivity in calcium-decorated hexagonal boron nitride monolayer

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In the present communication, we study the most important thermodynamic properties of novel calcium-decorated h-BN monolayer in the phonon-mediated superconducting state [1]. The analysis is motivated by the fact that the discussed material exhibits the highest superconducting critical temperature among alkali-doped h-BN structures, which is well above the temperature of liquid helium. The presented investigations of the thermodynamic properties are performed within the Eliashberg formalism [2], according to the expected strong-coupling character of the considered superconducting state. In particular, we calculate the thermodynamic properties of the superconducting state that allows us to quantitatively determine values of the characteristic dimensionless parameters i.e. the zero-temperature energy gap to the critical temperature, the ratio for the specific heat, as well as the ratio corresponding to the zero-temperature magnetic critical field. The obtained result are expected to provide interesting contribution toward further development of the two-dimensional hexagonal superconductors aimed at relatively high critical temperatures [3].

References:

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