

عنوان مقاله:

Design of nanoscale self switching diodes with high rectification ratio based on two-dimensional semiconductor hBCN

محل انتشار:

مجله بین المللی ابعاد نانو، دوره 13، شماره 4 (سال: 1401)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

In this paper, we present a new self-switching diode (SSD) realized with a two-dimensional semiconductor hexagonal boron carbon-nitrogen (hBCN) monolayer. Channel length and width are ۴.۵ nm and ۱.۲۳ nm respectively. The device operation is simulated based on the Extended Huckel method and Nonequilibrium Green's Function (NEGF) Formalism. The simulation results indicate non-linear I-V characteristics of the nano-diode and a current rectification ratio near ۱۱۲۵۰ that is higher than previous SSD structures reported before. Also, the effects of channel width on the electrical characteristics of SSDs are investigated. It can be found that the bandgap value of hBCN plays an important role in the modulation of current in the channel. Transmission pathways are provided under reverse and forward biases to show channel opening and pinch-off conditions. The results indicate that hBCN is a promising material for (the realization of self-switching diodes (SSDs

کلمات کلیدی:

Extended Huckel Method, Nanoscale Self Switching Diode, NEGF, Rectification Ratio, Transmission Pathways

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