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Screening effect on electronic and field-emission properties of graphene nanoribbons WAN-SHENG SU, National Center for High-performance Computing, HAN HU, TSAN-CHUEN LEUNG, Department of Physics, National Chung Cheng University — The electronic and field-emission properties of zigzag graphene nanoribbons (ZGNRs) influenced by manipulated nanostructure width (L_w) and nanostructure-to-nanostructure separation (D_x) are investigated using first-principles calculations. The corresponding characteristics, including band gap, magnetic moment, field enhancement factor and work function are explored and presented. It is found that the behavior of those properties under saturation versus D_x is observed, and the corresponding values approach their limits as D_x increases to a certain value. In addition, the electric-field-induced changes in band gaps of the ZGNRs with expanded separation are much more significant than those of ZGNRs with little separation. These phenomena can be attributed to physical origins such that the greater the separation between ZGNRs, the less significant the screening effect becomes. Finally, the altered magnetic moment of the ZGNRs due to the presence of an external electric field is analyzed and discussed.

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