

# Study of edge states in zigzag graphene nanoribbons (ZGNR)

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Edge states first appeared in quantum hall effect. K.Nakada *et al.*, proved its existence theoretically in graphene ribbons. Recently, edge states are found to be the origin of zGNR's half-metallicity.

**Abstract:** Using non-equilibrium Green function(NEGF) method, combined with density functional theory, we studied edge states in zigzag graphene nanoribbon with width of odd number (5,7) dimer chains. After hydrogenation in the central carbon atoms, as we expected, new edge states appear, which leads to higher conductance.

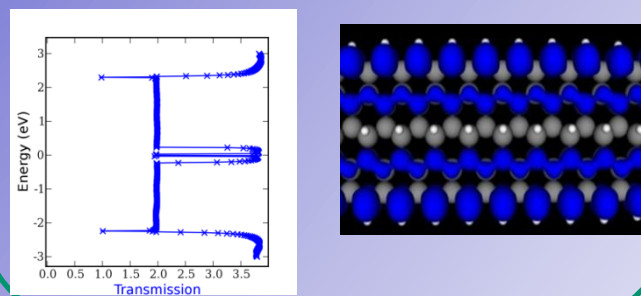
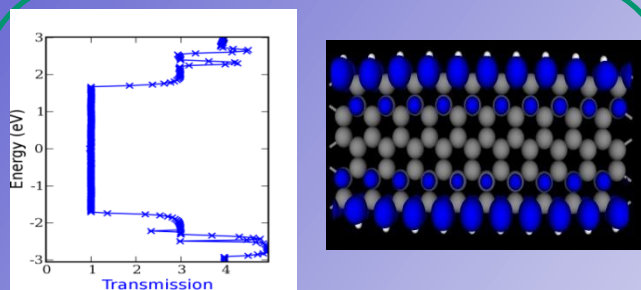


Fig.1

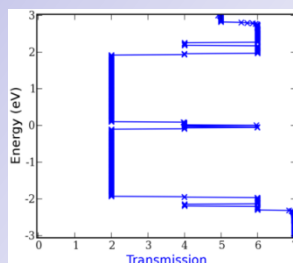
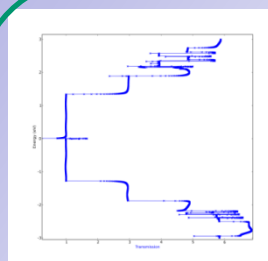


Fig.2

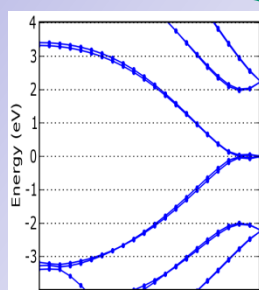
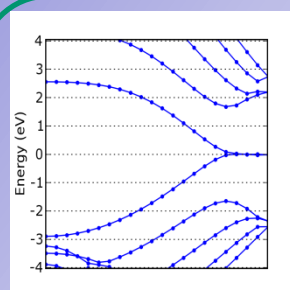


Fig.3 The band structure of 5 dimer chains zGNR (left) and its hydrogen version (right).

