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Applications of graphene in nanotechnology : 1D diffusion, current drag and nanoelectrodes

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Stellingen

Behorend bij het proefschrift

APPLICATIONS OF GRAPHENE IN NANOTECHNOLOGY

1D DIFFUSION, CURRENT DRAG AND NANOELECTRODES

1. Graphene nanoribbons provide a path for one-dimensional diffusion of cobalt adatoms. *Chapter 2 of this thesis.*
2. The observed motion of cobalt adatoms on graphene nanoribbons induced by voltage pulses from an STM tip is consistent with thermal diffusion. *Chapter 2 of this thesis.*
3. The voltage signal across a graphene strip that arises when a droplet of ionic liquid is moved over it, is affected by the polarizability of water. *Chapter 3 of this thesis.*
4. Contacts formed between graphene edges provide evidence that the conductance of a single carbon atom bridging graphene electrodes is equal to the quantum of conductance, to within 20%. *Chapter 4 of this thesis.*
5. The voltage induced by the motion of a droplet of ionic liquid over the surface of graphene depends both on the interaction of ions with the graphene layer and with the substrate supporting the graphene layer. *Yin et al., Nature Nanotech. 9, 378 (2014).*
Yang et al., J. Am. Chem. Soc. 42, 13746 (2018).
6. The statistical distribution obtained for electrically driven rotation of butyl methyl sulphide molecules in the work of Tierney *et al.* does not provide enough evidence to support their claim of current-induced directional rotation of the molecular rotor. *Tierney et al., Nature Nanotech. 6, 625 (2011).*
7. The use of a graphene nanogap in DNA translocation measurements has no advantageous properties over a graphene nanopore if the measured current is ionic rather than electric. *Patel et al., PLoS One 12, e0171505 (2017).*
8. The remote heat dissipation induced by a current through an atomic contact, as reported by Tsutsui *et al.*, does not exist. The maximum of the dissipation is centered at the atomic contact. *Tsutsui et al., Scientific Reports 8, 7842 (2018).*

Sasha Vrbica
Leiden, 12th of December 2018