# Search for shell effects in metallic nanowires

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**Stellingen**

behorende bij het proefschrift

"Search for shell effects in metallic nanowires"

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1. Shell closing effects are generally present in free-electron and nearly-free-electron metal nanowires and influence their stability.
   *This thesis (chapters 4, 5, 6)*

2. Magic nanowire diameters resulting from shell effects persist under ambient conditions for gold, silver and aluminum.
   *This thesis (chapters 4, 5, 6)*

3. The low count numbers at low values in the conductance histograms for magnesium may be the result of a transition to a non-metallic state at small nanowire diameters.
   *This thesis (chapter 6)*

4. Monoatomic chains that are softer grow longer.
   *This thesis (chapter 7)*

5. The resistance between two macroscopic silver paint contacts placed on the surface of a silver sulphide film can be made to switch between high and low values by the polarity of the applied voltage, at room temperature in air.
   *A. I. Yanson, D. Djukic, A. F. Otte, W. H. A. Thijssen, A. I. Mares and J. M. van Ruitenbeek, unpublished.*

6. The nanoswitch described by Terabe *et al.*, based on a sandwich structure of silver, silver sulfide and a metal layer, is more likely the result of a nanowire growing *through* the silver sulfide layer rather than on top of it.
   *K. Terabe, T. Hasegawa, T. Nakayama, M. Aono, Nature* ***433****, 47 (2005).*

7. The temperature dependence of the mobility in an organic field effect transistor is influenced by the underlying dielectric.
   *I. N. Hulea, S. Fratini, H. Xie, C. Mulder, N. Iossad, G. Rastelli, S. Ciuchi, and A. Morpurgo, Nature Materials, in press.*

8. The observation of half-integer conductance quanta for Fe, Co, Ni, and Pt atomic contacts presented in the literature and assigned to a magnetic state of atomic contacts is more likely due to a molecular contamination (e.g. CO) creating a molecular bridge with half-integer conductance.
   *C. Untiedt, D. M. T. Dekker, D. Djukic, and J. M. van Ruitenbeek, Phys. Rev. B* ***69****, 081401, (2004); see also M. Kiguchi, D. Djukic, and J. M. van Ruitenbeek, submitted to Nanotechnology (cond-mat/0610250).*