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Stellingen

behorend bij het proefschift "Towards thermo- and superlubricity on the macroscopic scale: from nanostructures to graphene and graphite lubrication"

1. It is, in principle, possible to make the subtle, friction-lowering role of thermal excitations noticeable on the macroscopic scale by shaping the interface between two solids into an array of individually oscillating contacts, each mimicking the mechanical properties of the tip apex of a friction force microscope.
   Chapter 2 of this thesis

2. A flat-on-rough geometry of a sliding interface that involves a diamond-like carbon coating on the rough side leads to highly localized structural transformations in this coating and to the generation, during the initial, run-in phase, of so-called third bodies that strongly dominate the lubricating properties of the coating.
   Chapter 4 of this thesis

3. The extremely long lifetime of contacts between a flat silicon surface and a DLC coating on a micropatterned substrate makes the frictional properties of this interface rather different from the tribological behavior otherwise found for DLC-lubricated contacts.
   Chapter 5 of this thesis

4. In spite of the weak, Van-der-Waals type bonding between graphene and copper, graphene is surprisingly effective in reducing friction between copper surfaces.
   Chapter 6 of this thesis

5. While the exciting physical properties of graphene trigger a large body of research towards potential, industrial applications, as described for instance by Penkov *et al.* for graphene's tribological properties, these applications currently remain strongly limited by the lack of professional methods to grow and transfer graphene on a macroscopic scale.
   Penkov, O. et al. Tribology of graphene: A review. International Journal of Precision Engineering and Manufacturing 15, pp. 577-585, 2014

6. As was demonstrated by Greiner *et al.*, manipulation of the local temperature can be a powerful tool to control friction in single contacts, due to the thermally activated nature of the formation and growth kinetics of capillary water bridges, which suggests that this approach can be employed also to control friction between rough, macroscopic surfaces.
   Greiner, C. et al. ACS Nano ***6****, pp. 4305-4313, 2012*

7. Finding a mechanism to make friction switchable on various length scales, can become a key element in the solution of some of the most pressing, current technological challenges.

8. Estimates by esteemed scientists of the fraction of the Gross Domestic Product of western countries that is spent on undesired friction and wear, range between 0.4% and 6%, which supports the fashionable view of science as 'just another opinion".
   Reeves, C.J. & Menezes, P.L. Ecotribology: Research developments. Ed. Paulo Davim, J., Springer, 2016, Chapter 2; https://www.linkedin.com/pulse/overcoming-most-common-lubrication-misconceptions-pt-

9. In spite of the common separation between fundamental research and hi-tech technological developments, the two can go hand in hand and greatly stimulate each other.

10. An optimal 'work-life balance' may not exist and whether one balances ones work and life optimally, one may know only in hindsight.

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