

Master assignment

Towards electrostatic manipulation in an open flow nanoreactor

Our aim is to study the absorption/desorption process of molecules by *in situ* attenuated total reflectance (ATR)-infrared (IR) spectroscopy. To study the adsorption/desorption of test molecules, a microdevice within a nanodimensional cross sections, has been proposed (see figure 1). In this study we will be apply an electrical field in the inner volume of the microreactor. The absorption of molecules is expected when the electrical field (E-field) is turned *on*, while desorption when the electrical field is turned *off*. To enhance the electrical field strength, and thus the absorption of the molecules, a small height (H) is needed, see figure 1(H1 = 500 nm and H2 = 900 nm)

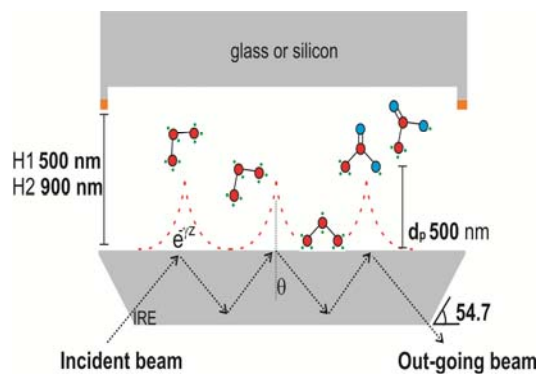


Figure 1. ATR-IR microreactor cross section

This research is performed in an unique environment with exposure to a multitude of disciplines, including: physics chemistry, surface science, materials science and E-field stimulated chemistry. We think that this project is an exciting option for students interested in nanotechnology.

Assignment

The student will study the influence of the E-field in the adsorption/desorption of proof molecules without nano/micro electrodes and with nano/microelectrodes. This also involves literature study. The assignment will be finalized with a written report and an oral presentation.

References

[1] S. B. Simonsen, Ib. Chorkendorff, S. Dahl, M. Skoglundh, J. Sehested and S. Helveg, *Journal of Catalysis*, 281(2011) 147-155

Useful links:

<http://www.utwente.nl/tnw/cpm/people/Susarrey/>

http://www.utwente.nl/tnw/mcs/people/ph_d_students/Arturo%20%20Susarrey-Arce/

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Starting date: Preferably 06/2012