

Woodpile fabrication and characterisation

– outcome report –

Aim of the visit

The purpose of the visit was to obtain new insight on the behaviour of the metal-covered woodpiles and well as polymer ones. Also, the possibility of confronting the measurements from two different laboratories is highly appreciated and needed in order to test the reproducibility and validity of the setups.

Carried out work

The first phase of the project included fabricating the polymer and metal-covered structures and in took place in-house at DTU. Thus, we had a total of 36 woodpiles grouped in the following manner: 18 polymer ones and 18 metal-covered. Each of the 18 sets was subdivided into 2X9, where one set was composed of woodpiles having 1 micrometer periodicity and the other had 1.5micrometers one. Each of the 9 woodpiles were further on separated into 3X3 sets where the first set had 1 period thickness, the second 2 and the third 3, thus having 3 nominally identical woodpiles for each type of structure.

The second part of the project took place at CPM and consisted in obtaining an as accurate as possible measurement of the woodpile behaviour. The setup used was a commercial micro-FTIR one. Using the in-built capabilities, we programmed the setup to measure 9 measures on each woodpile, generating a theoretical total of 648measures divided into 324 transmission and 324 reflection ones. Still, since the transmission of metal-covered woodpiles was not possible due to the high losses in such structures, the total amount of measures was 486. Due to the system's possibility of having automated measurements, we could perform them in a reproducible manner.

Obtained results

Due to the large amount of data obtained during these 4 days, the interpreting of the results is still ongoing. With all this, a first outcome shows a certain dependency of e.g. sample thickness with respect to the depth of the dip can be seen. Such behaviour is characteristic for Bragg gratings and confirms a first theoretical assumption as well as the stability of the measurements (see figure 1).

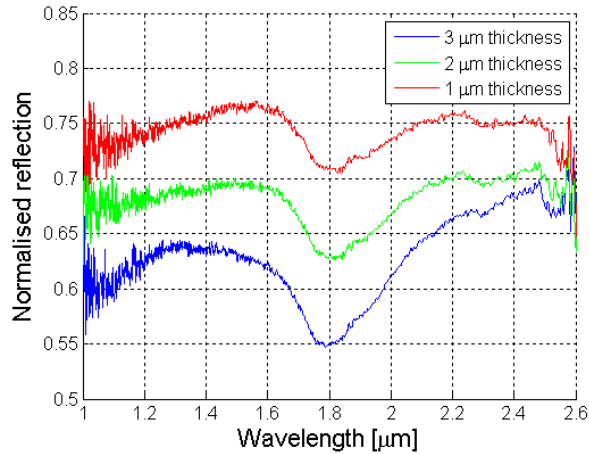


Figure 1. Normalised reflection (with respect to a calibrated silver mirror) of metal-covered woodpile of 1 micrometer period

Future collaboration

Based on these first experiments, and due to the complementarities between the setups at DTU and CPM, we believe that further common measures will take place also on different structures that may show more evolved behaviour like magnetic resonances and/or electric ones that can show e.g. increased dependency with respect to surrounding media thus leading to high-sensitive sensors.

Projected publications

Since the analysis of the measurements is still ongoing, we do not yet know if and how they will be published. In any case, as soon as the analysis will be finished, we will be able to assess the publication strategy.

Appendix 1. Plane ticket

DIN RESERVATION / KVITTERING	
Kære Radu Malureanu	
Nemrejse.dk a/s - takker for din reservation til London. CVR: 28711670	
Dit reservationsnummer: Fly: Y2BVUA Betalingsnummer: 4673185	Du har bestilt rejsen den: 07. mar. 2011

VALGTE REJSE				
Dette er blot en bekræftelse på reservationen og kan derfor ikke benyttes som rejsedokument. Dette modtager du direkte fra rejsebureauet i form af en vejledning til print af elektronisk billet (e-ticket) pr. mail.				
Fly	1630 DKK			
Antal	Type	Pris	Skat	Total
1	voksen	790	840	1630
Pris i alt		1630 DKK		
Udrejse:		Afrejse:	Ankomst:	
København-London Heathrow		Fr, 01. apr. 18:05	Fr, 01. apr. 19:05	
British Airways - BA819				
Hjemrejse:		Afrejse:	Ankomst:	
London City-København		Sø, 10. apr. 18:05	Sø, 10. apr. 20:50	
British Airways - BA8467				

PRISOVERSIGT	
Fly	1630 DKK
Total	1630 DKK

PERSONOPLYSNINGER		
Voksen 1		
Hr.	Fornavn(e): Radu	Efternavn: Malureanu 32 år / 08. feb. 1979
	Bonuskort: BA	Nummer: 17247348

BETALER / BILLETMODTAGER	
Fornavn(e): Radu	Efternavn: Malureanu
Adresse: Kollelevbakken 7a, st.tv.	
Postnr.: 2830	By: Virum
Land: Danmark	
Telefon: 4545256377	Mobil: +4560619833
E-mail: rmalu7@gmail.com	

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OBS! Når rejsen er betalt fremsendes flybilletter / rejsedokumenter pr. e-mail inden for 2 hverdage. Det er kundens forpligtelse at kontakte os for assistance såfremt billetter/ evt. øvrige rejsedokumenter (forsikringspolice, billeje/hotel voucher) ikke er fremkommet på mail indenfor 3 hverdage efter reservationen. I modsat fald kan rejsebureauet ikke påtage sig ansvar for eventuelle følgedgifter heraf.
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Appendix 2. Total costs

Item	Price (EUR)
Plane	218.57 (1630DKK at 1:7.45745 EUR:DKK exchange rate)
Daily allowance	340
Total	558.57