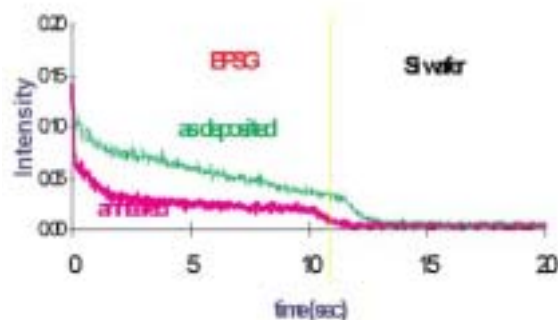


# Analysis of Hydrogen

GDS can measure Hydrogen. The sensitive wavelength for H is at 120nm (in the VUV range of the spectrum - which requires high quality optics). Hydrogen diffuses easily, it is responsible of corrosion processes at grain boundaries and could degrade the material properties. Observed simultaneously with C during a GD analysis it reveals the presence of organic compounds; together with S, it may reveal acid attacks.



*H signal of a wafer before and after annealing*

For a proper calibration of organic coatings, it is important to quantify H which is one of the key elements. Hereafter is given a repeatability test done on a cataphoresis layer including data on H.

Reference	C%	O%	H%	Tl%	Si%	Al%	Pb%	Sn%	e(μm)
D	48.3	29.2	3.9	13.5	2.3	1.46	0.71	0.45	15.2
D1	46.8	31.5	3.7	13.2	2.2	1.41	0.76	0.49	16.7
D2	48.4	28.4	3.5	15.5	2.4	1.59	0.80	0.0	15.2
D3	47.2	29.2	3.8	15.2	2.5	1.57	0.79	0.24	15.2
D4	49.3	27.3	3.3	15.1	2.6	1.63	0.75	0.23	14.7
D5	47.0	29.0	4.0	14.7	2.5	1.57	0.76	0.18	13.8
Average	47.8	29.1	3.7	14.5	2.4	1.54	0.76	0.31	15.4
Absolute sigma	1.0	1.4	0.3	1.0	0.15	0.08	0.03	0.13	0.8
Relative sigma	2.0	4.8	8.0	6.6	6.2	5.20	3.90	41.0	4.9

Even a small amount of H is also known to affect the emission yield of other elements. This effect is described in an article published by R. Payling "Improved quantitative analysis of hard

coatings by rf-GD-OES" (published in JAAS, 2000) and is taken into account in Quantum software.

*Key points : GD can determine H*

**In the USA:**  
 Jobin Yvon Inc.  
 3880 Park Avenue  
 Edison, NJ 08820-3012  
 Toll-Free: +1-732-494-8660  
 Fax: +1-732-549-5125  
 E-mail: info@jobinyvon.com  
 www.jobinyvon.com

**In France:**  
 Jobin Yvon S.A.S.  
 16-18 rue du Canal  
 91165 Longjumeau cedex  
 Tel : +33 (0) 1 64 54 13 00  
 Fax : +33 (0) 1 69 09 07 21  
 E-mail : info@jobinyvon.fr  
 www.jobinyvon.fr

**In Japan :**  
 Horiba Jobin Yvon CO., LTD.  
 Higashi-Kanda Daiji Building  
 5<sup>th</sup> Floor Higashi-Kanda, Chiyoda-ku, Tokyo  
 Tel: +81 (0) 3-3861-8231  
 Fax: +81 (0) 3-3861-8253

**Germany:** +49 (0) 89 4623 17-0  
**Italy:** + 39 0 2 57603050  
**UK:** +44 (0) 20 8204 8142

