TE / VSC – SCC
Laboratoire de Chimie

Domaine : Chimie analytique	*N° VSC–SCC :* X-07/02.12
Requérant : Ian Crotty PH/UCM - 164414	*Date de réception :* 27 Février 2012
Objet de la demande: *Identification of organic contamination on "HPL plates" for CMS Muon Trigger upgade (RE4) – Samples from Italian company -*	
Analyses et rapport réalisés par: **Benoit Teissandier, Marius Lungulescu, Colette Charvet** *Date :* **29 février 2012**	*Vérifié par :* **Sorin Ilie**

Received samples:

- Two MEK (Methyl Ethyl Ketone) solutions from GT Machine (noted A and B solutions)
- 1 piece of "red rubber"
- Plastic threads (brush bristles)

Method, instrument:

FT-IR spectroscopy - Bruker Vertex 70:
- Transmission mode
- ATR mode

Results:

The "red rubber" sample was identified as polyurethane; its ATR FT-IR spectrum (Fig.1) is similar to the contaminating layer measured on "HPL plate" (see https://edms.cern.ch/file/1195092/1/I.Crotty_X060212.pdf).

The FT- IR spectra of the analysed A and B MEK solutions show that the both solutions are contaminated with TPU (thermoplastic polyurethane) (Fig. 1)

The "red rubber" sample was immersed in MEK (1 hour) in chem. lab. The FT-IR spectrum of the resulted residuum after MEK evaporation is shown in Fig. 2. It confirms that MEK dissolve the "red rubber".

The ATR FT-IR spectrum of the plastic threads (brush bristles) evidenced polyamide-6 as the base material (Fig. 3). The plastic threads were immersed in MEK (15 hours). The FT-IR measurement does not shown any noticeable contamination with polyurethane or polyamide-6 (Fig.4).

Fig. 1 - FT-IR spectra of received samples

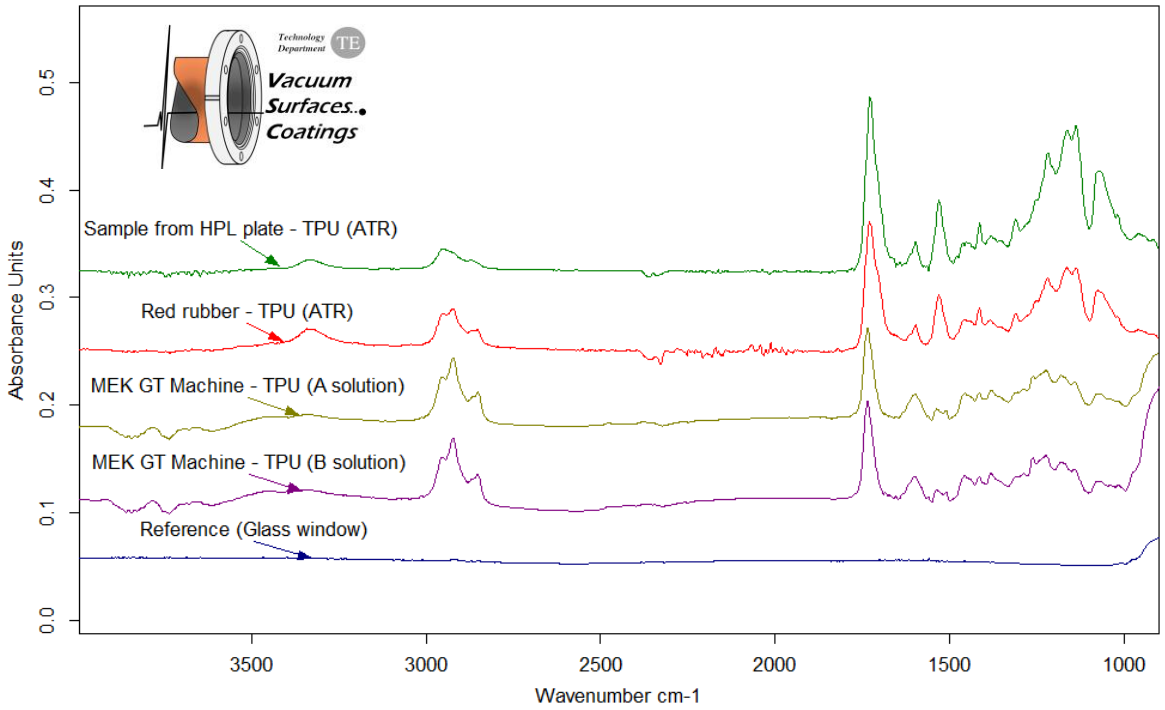


Fig. 2 - FT-IR spectrum of dissolved red rubber in MEK solution (residuum)

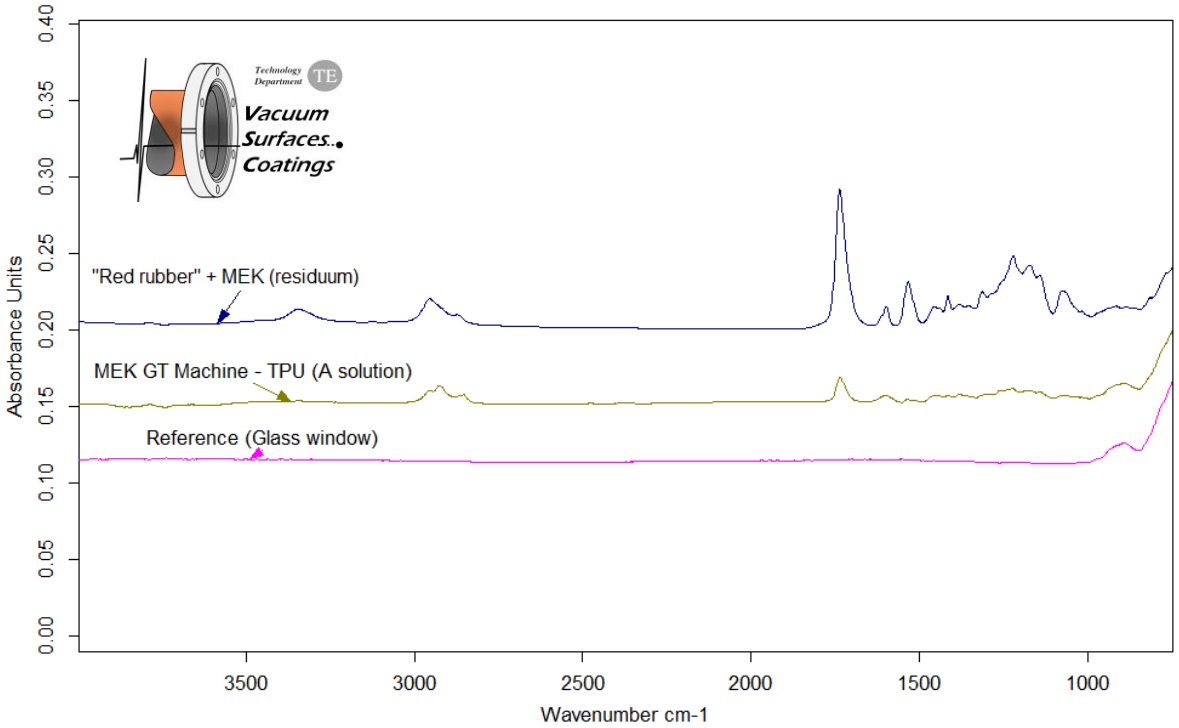


Fig. 3 – ATR FT-IR spectrum of plastic threads (brush bristles)
-Compared with a database spectra-

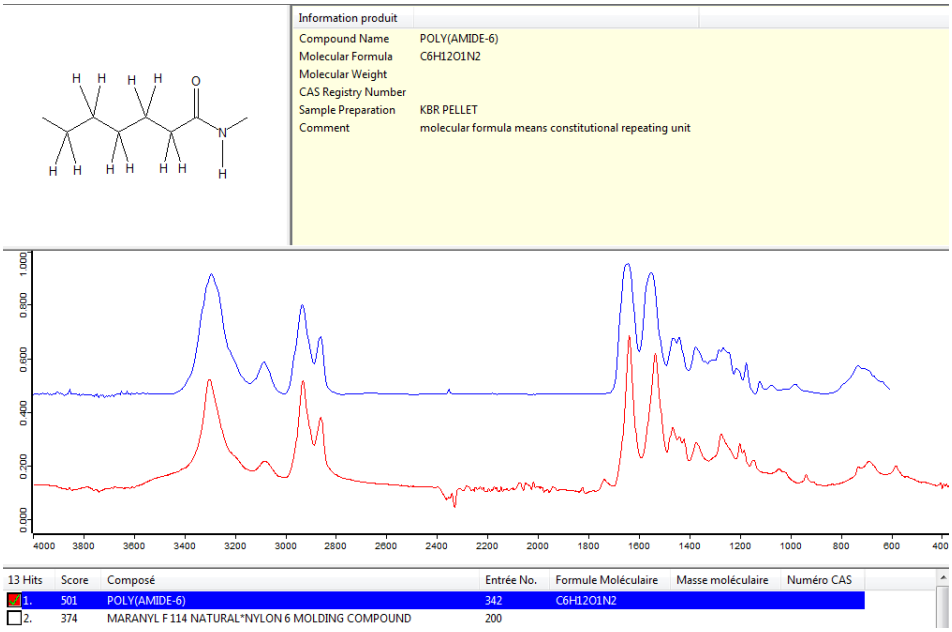
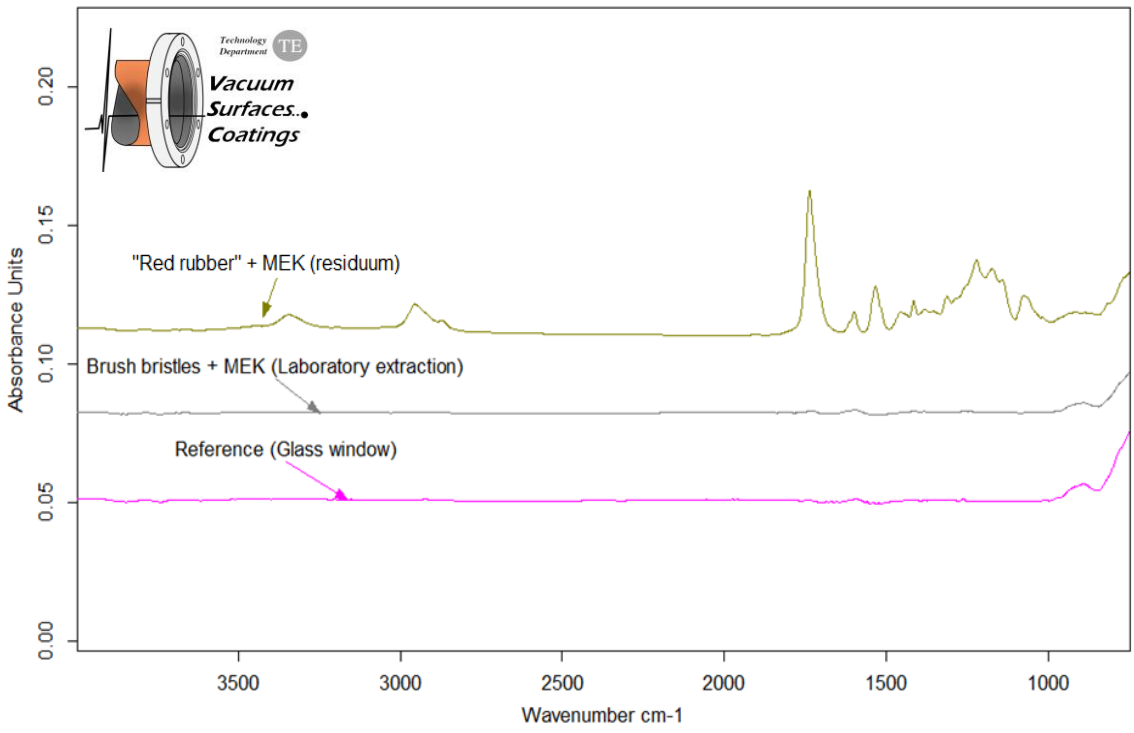
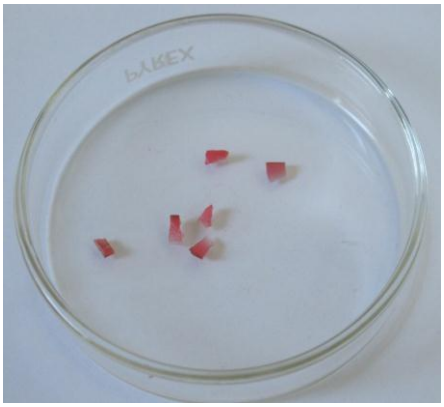


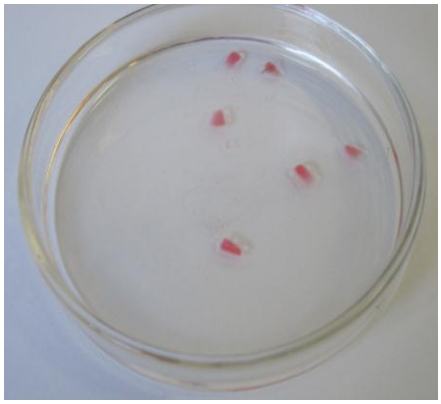
Fig. 4 - FT-IR spectrum of the plastic threads (brush bristles) extracted in MEK solution



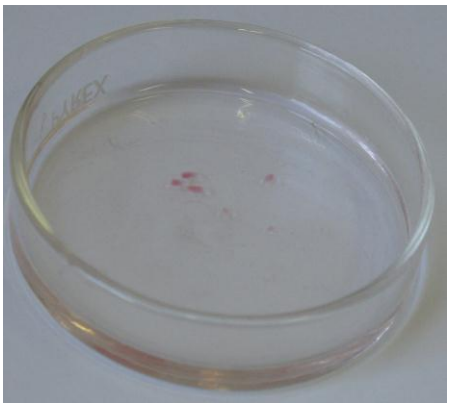
Annex 1:

Steps of “red rubber” dissolution in MEK (laboratory test).

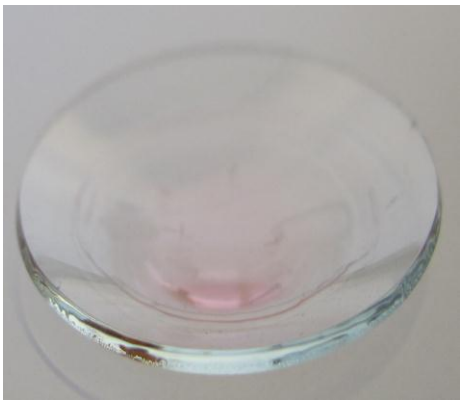




After 10’



After 30’



After 60’