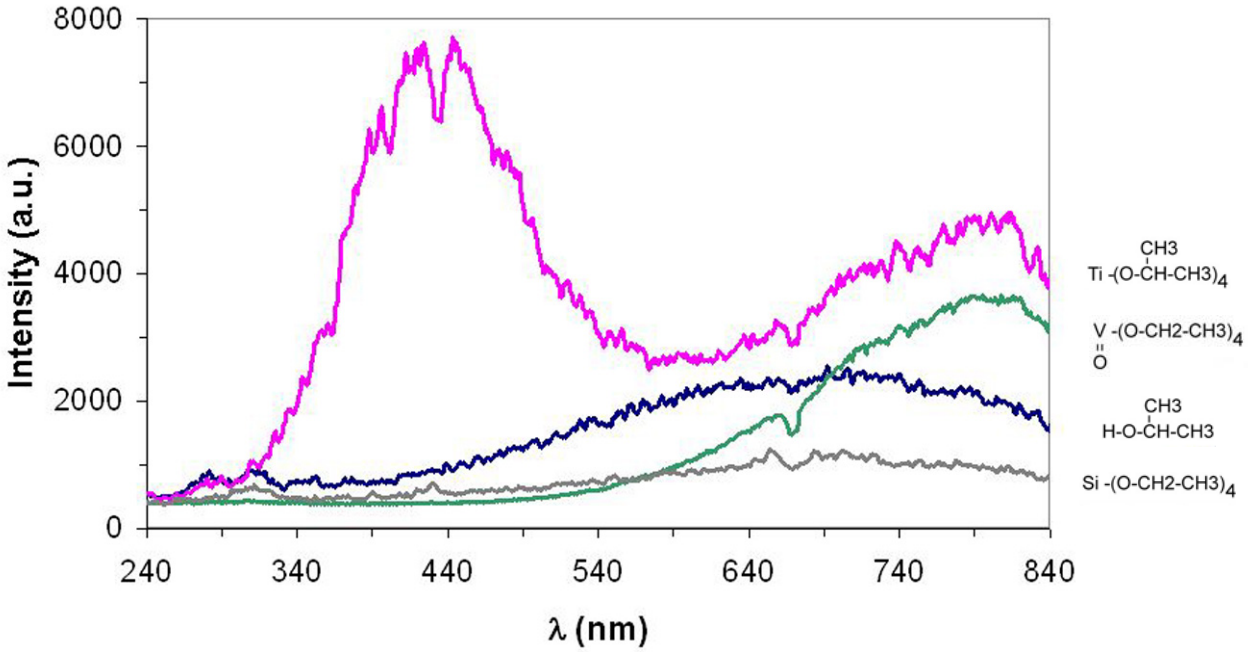
FLAME STRUCTURE

LIGHT EMISSION SPECTRA

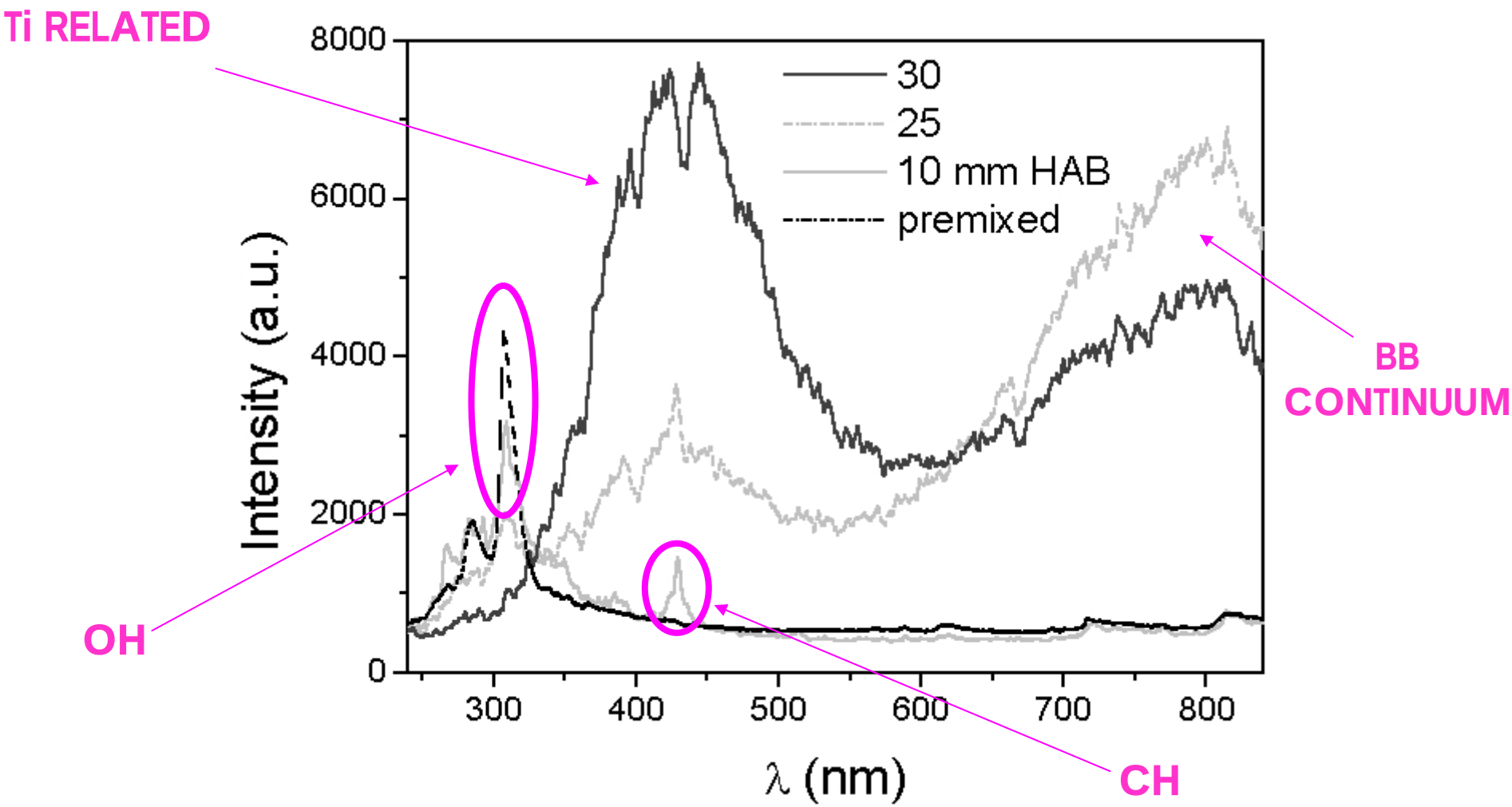
Possible contribution from **TiO** *(Linton, and Broida, J. of Molecular Spectroscopy, **64**: 382 (1977)).*



Typical emission spectra from **TiO_2** (red), **SiO_2** (grey), **V_2O_5** (green), **Isopropanol** (blue) flames. Injected compounds are indicated.

FLAME STRUCTURE

Titania-LIGHT EMISSION SPECTRA



R.P. Porter et al., Proc. Combust. Inst. 11 (1966) 907.

EX SITU PARTICLES CHARACTERIZATION

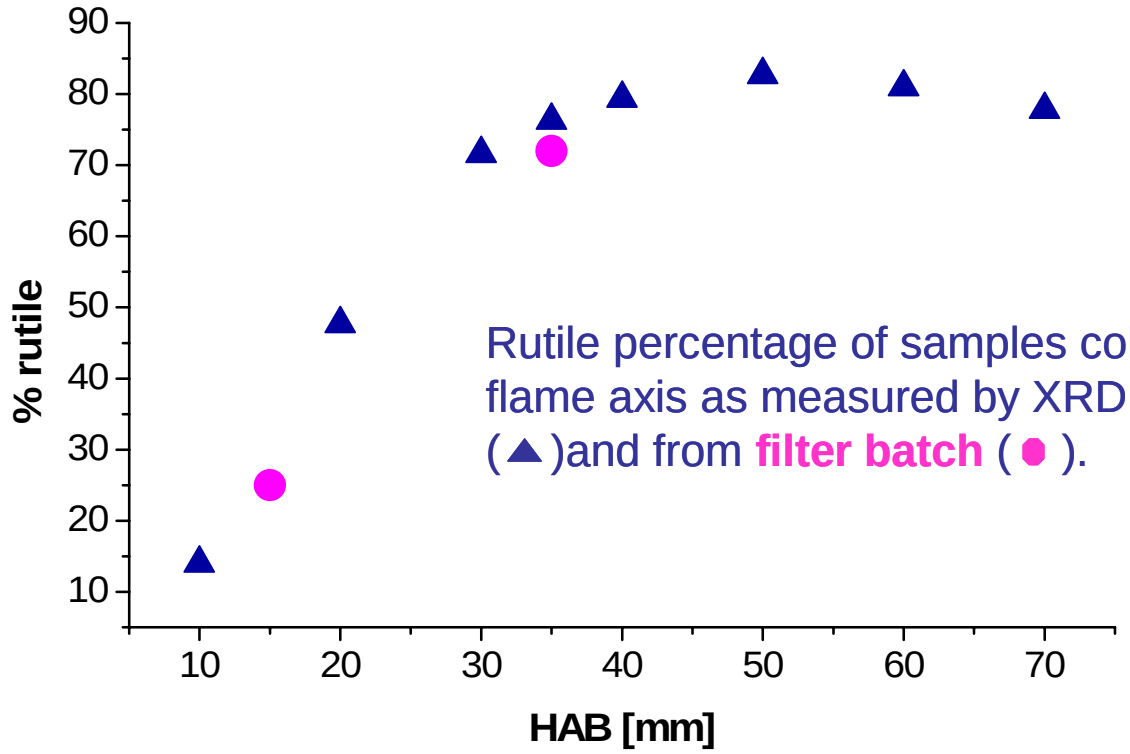
The mainly used techniques were :

- X-Ray Diffraction (XRD)
- Trasmission Electron Microscopy (TEM)
- Fourier Transform Infrared Spectroscopy (FTIR)

TITANIA Characterization

XRD

Samples from CSP and Filter batch



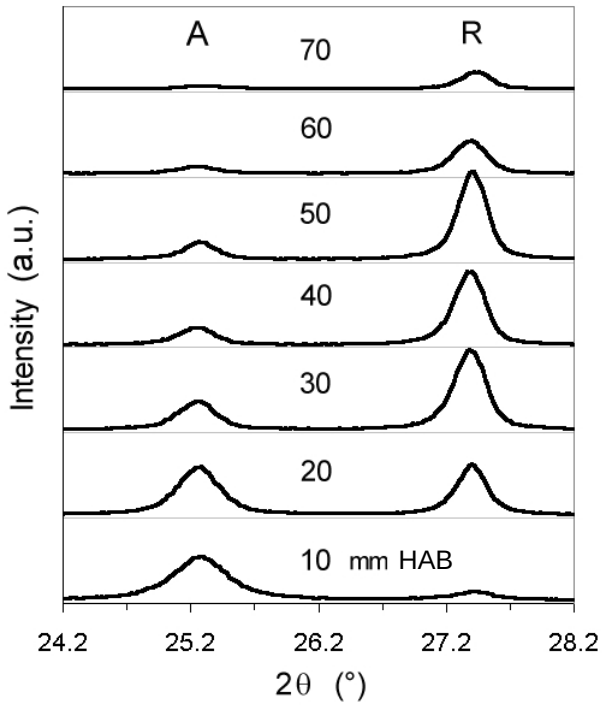
Rutile percentage of samples collected along the flame axis as measured by XRD in **CSP** samples (▲)and from **filter batch** (●).

Good agreement concerning the phase composition

TITANIA Characterization

XRD- Samples from CSP

$$\%R = \frac{1}{\left[\left(\frac{A}{R}\right) \times 0.884 + 1\right]} \times 100$$



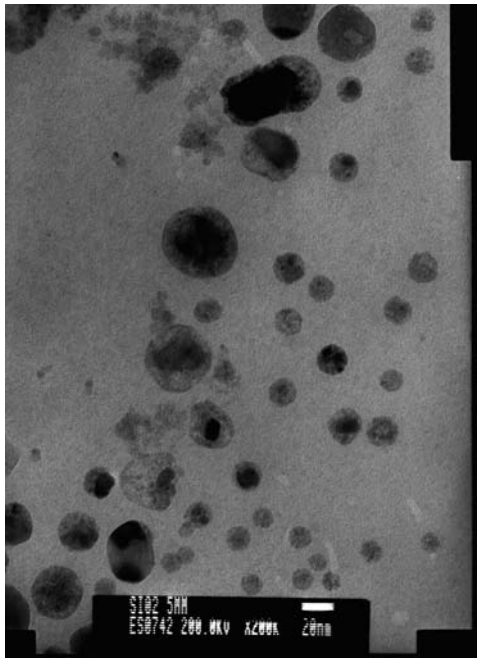
where A and R are the areas of the major peak of anatase (2ϑ = 25.3° for the (101) reflection) and rutile phase (2ϑ = 27.5° for the (110) reflection of rutile), respectively.

Areas calculated by fitting the A and R curves using the Pearson equation

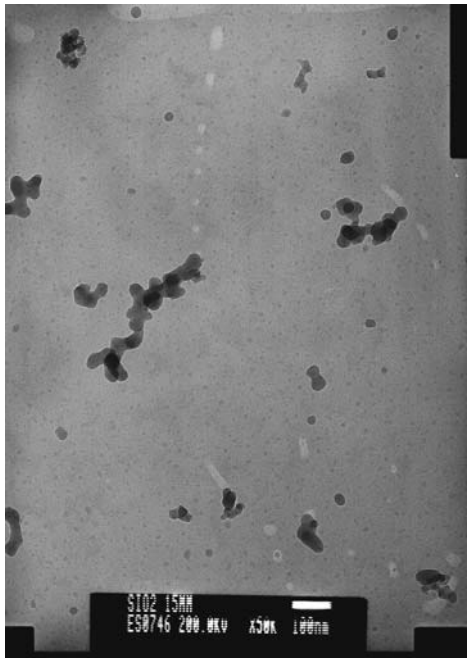
Samples collected by the **Sucking pipe**

SILICA Characterization

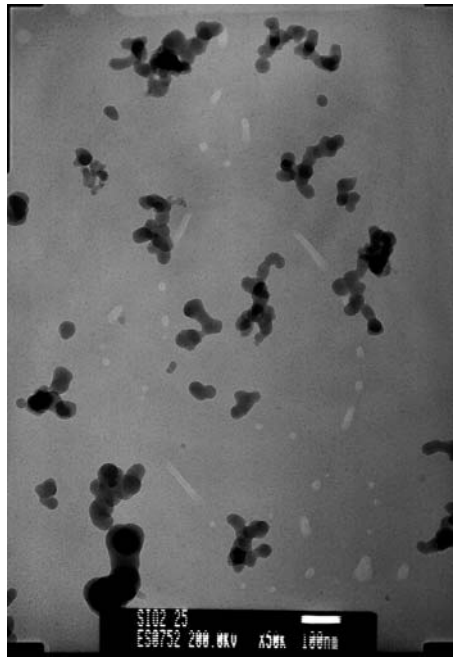
Termophoretic sampling 50 ms (r.t.)



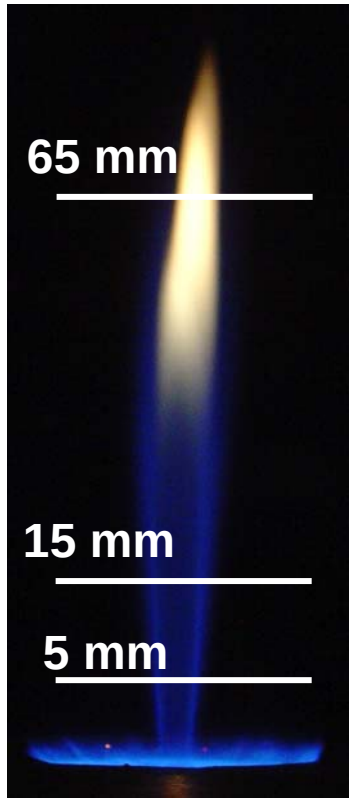
5mm HAB



15mm HAB

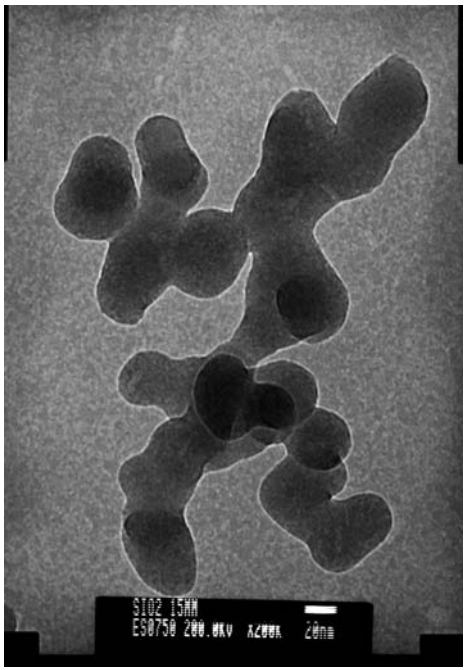


65mm HAB

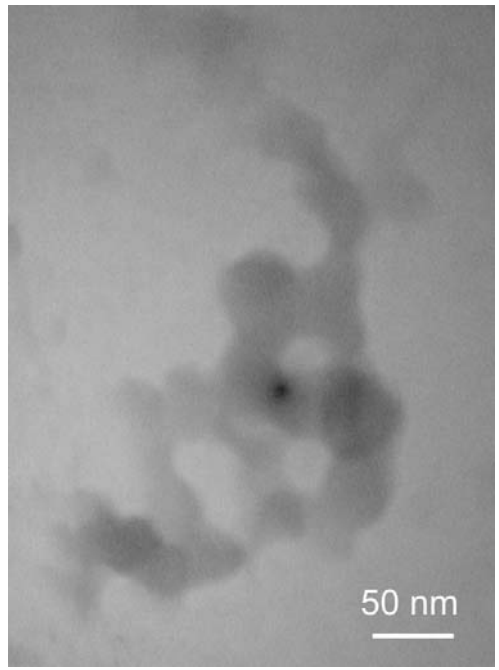


SILICA Characterization

Thermophoretic Sampling



Cooling sucking Probe

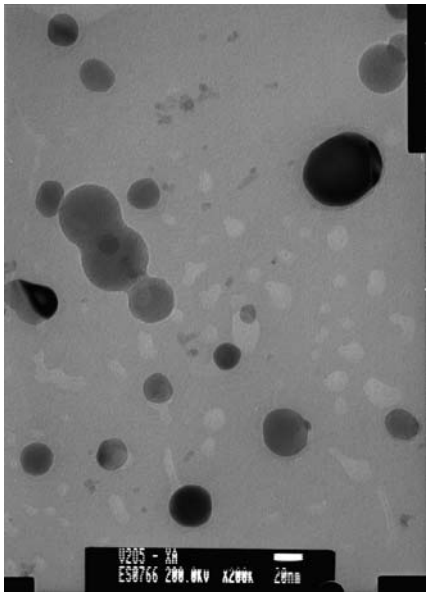


40mm HAB

VANADIA Characterization

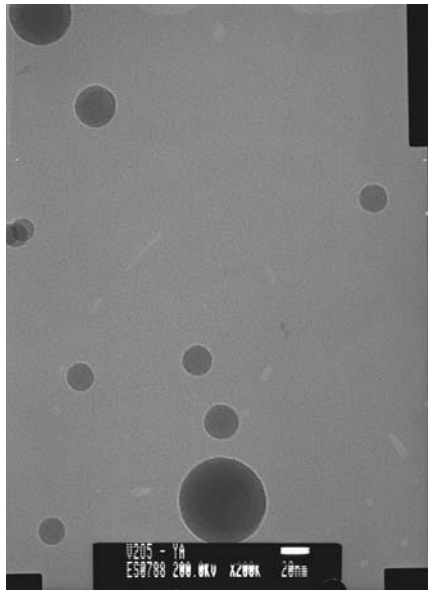
TEM -Termophoretic sampling 50 ms (r.t.)

5 mm HAB



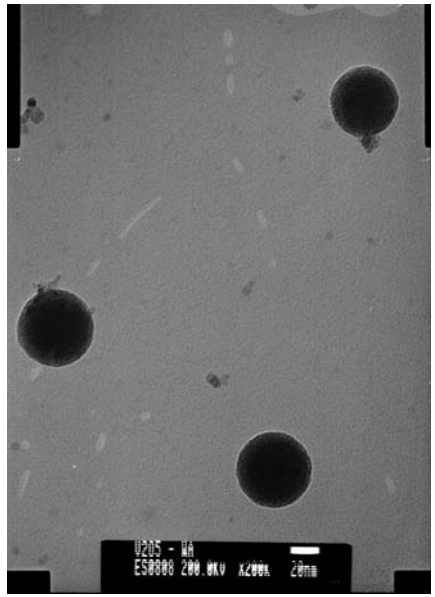
d_p=12-35 nm

15 mm HAB



d_p=20 nm

40 mm HAB



d_p=40-50 nm