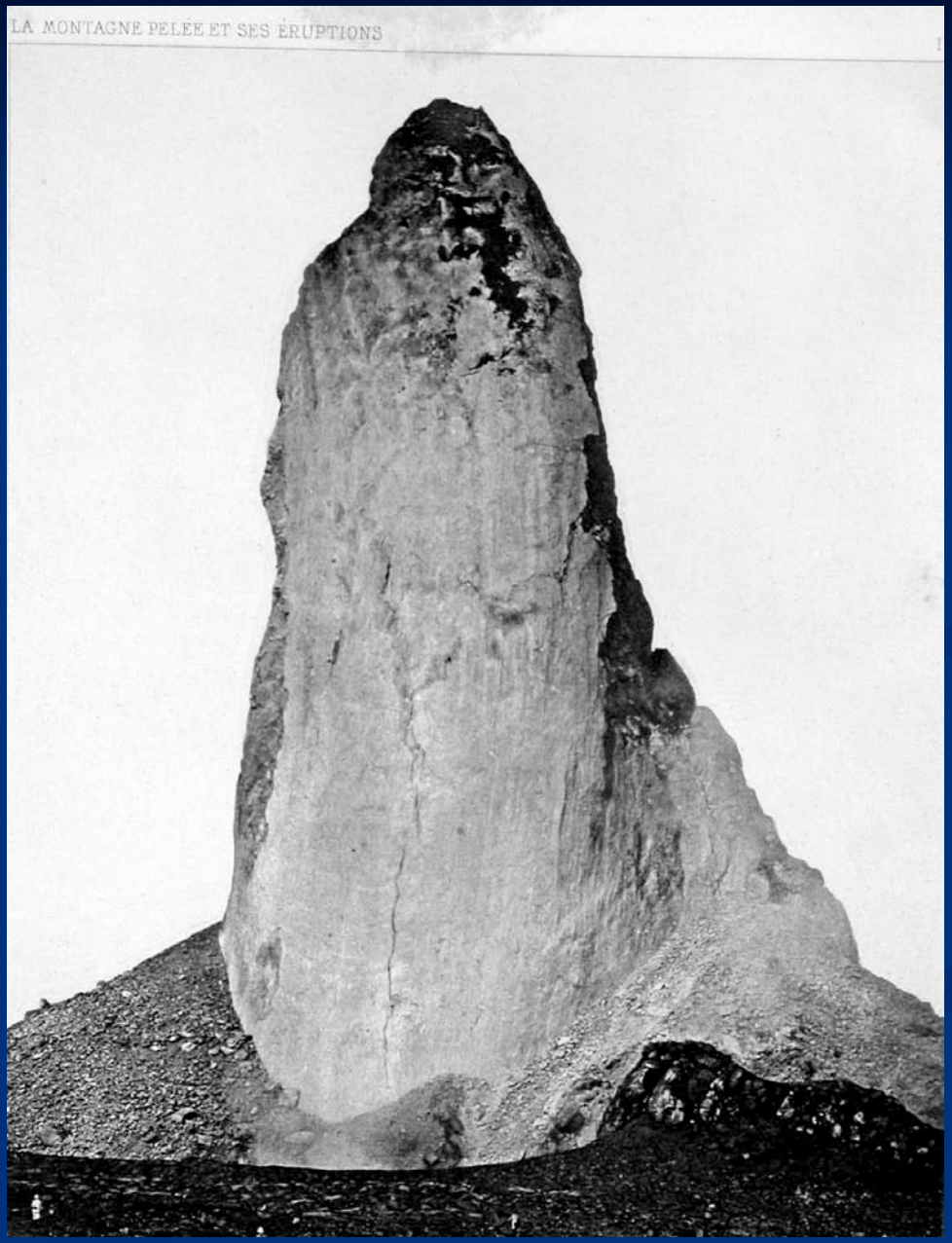
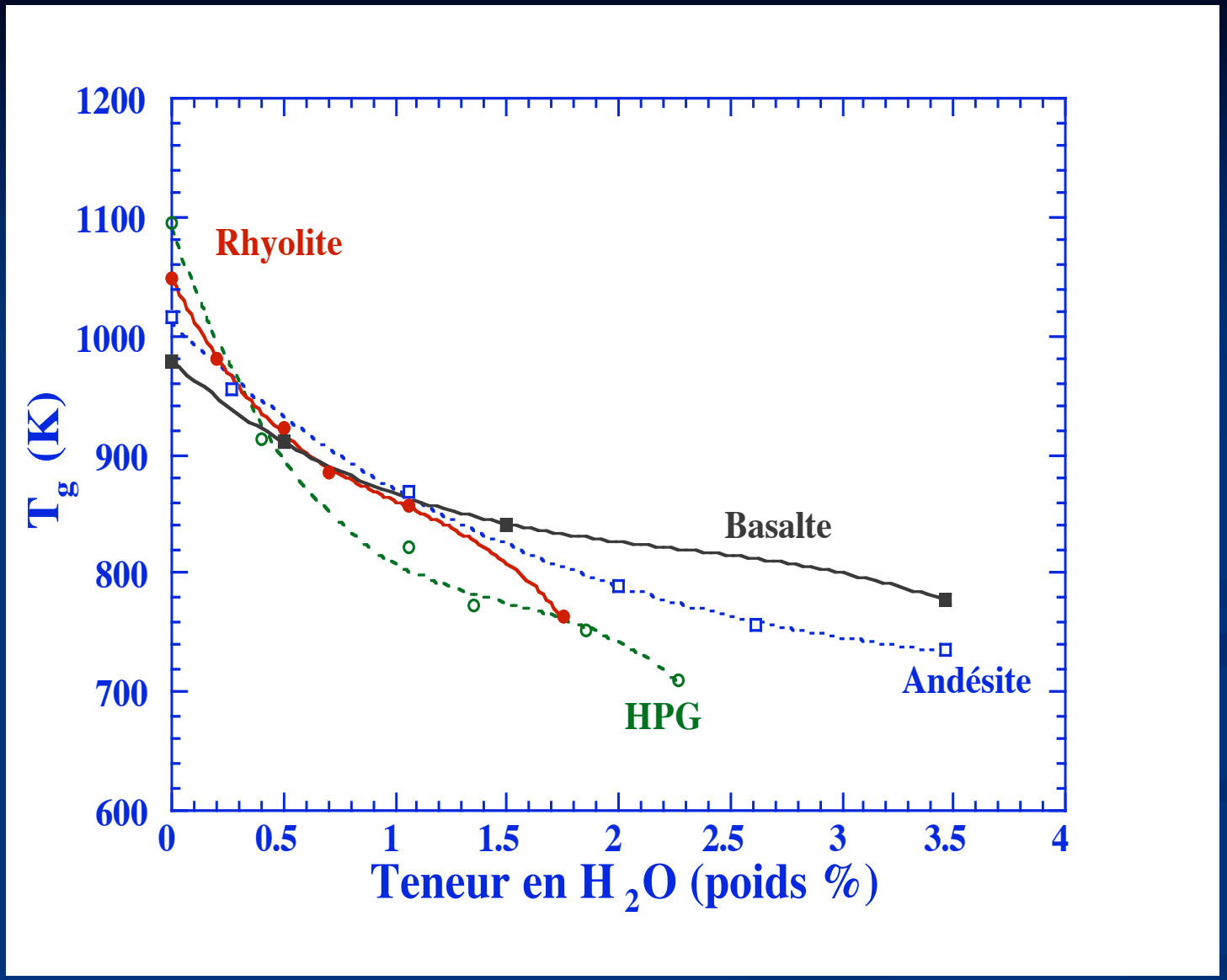
# Effet de l'eau sur un silicate fondu

Mt. St. Helens, USA, 1980; photo by M.P. Doukas, USGS

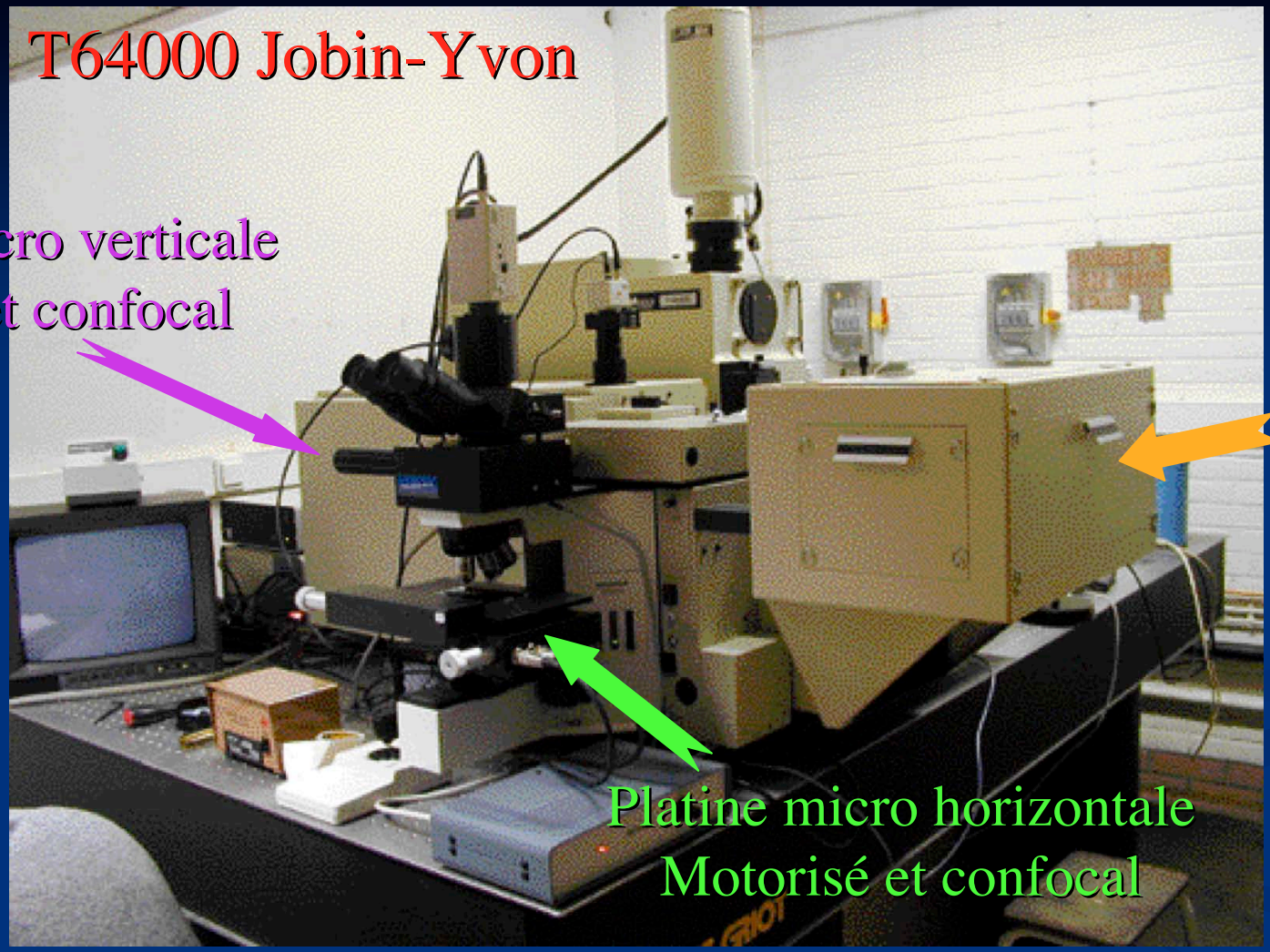


# Effet de l'eau dissoute



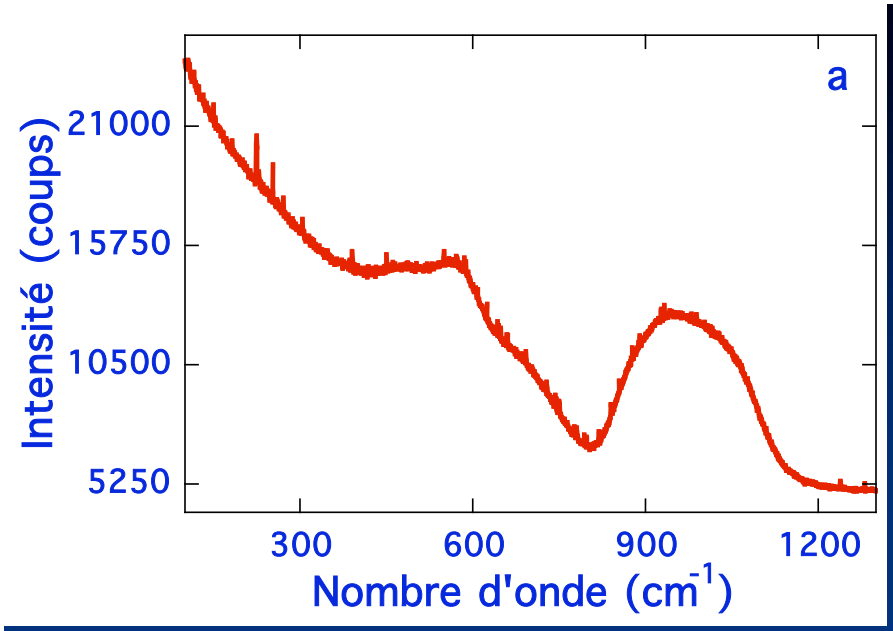

Tg = transition vitreuse entre verre et liquide,
correspond à une viscosité de $10^{13}$ Poises

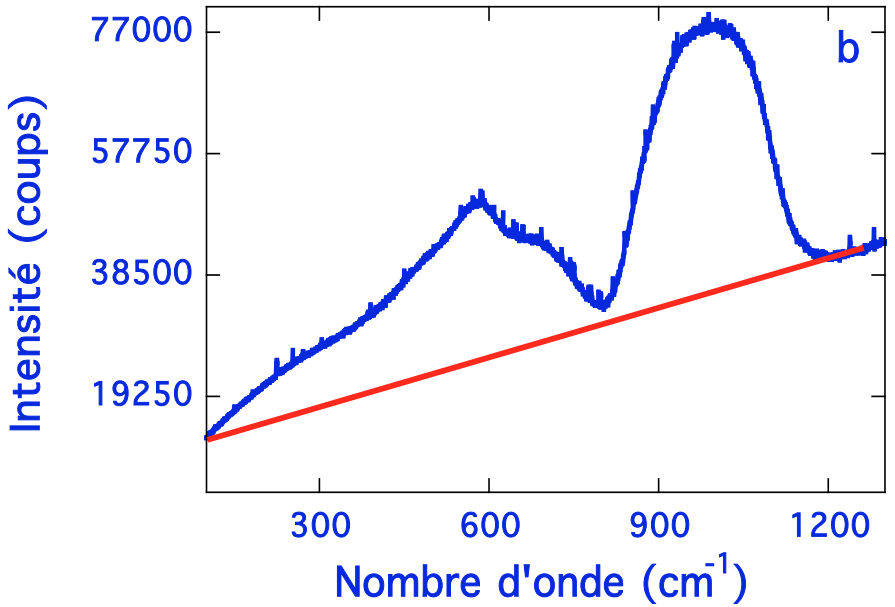
# T64000 Jobin-Yvon



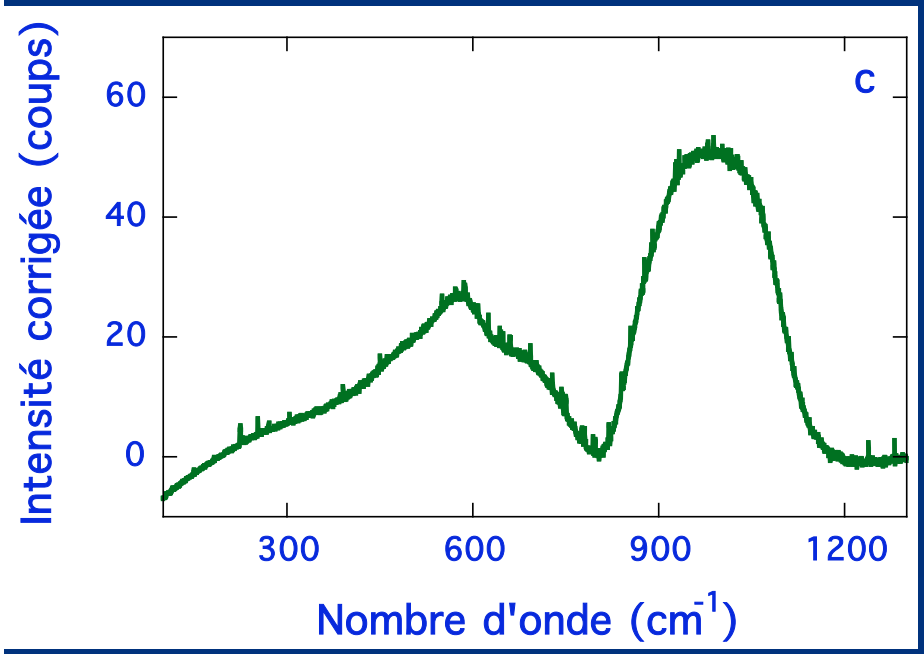

Excitatrices : - Laser Coherent Ar -5W, 514, 488…..

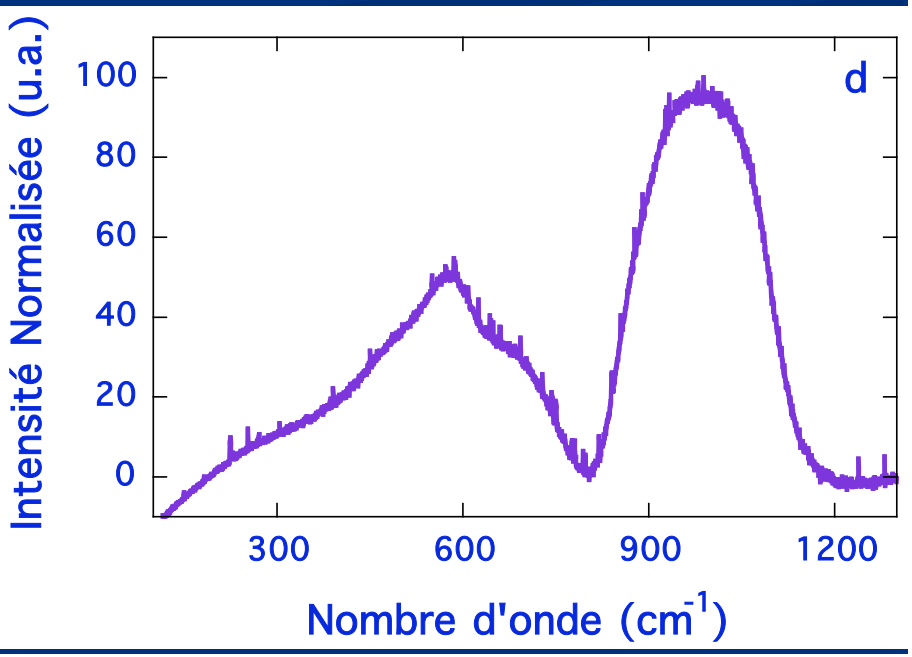
- Laser Coherent Kr 5W, 647, 679, 799…



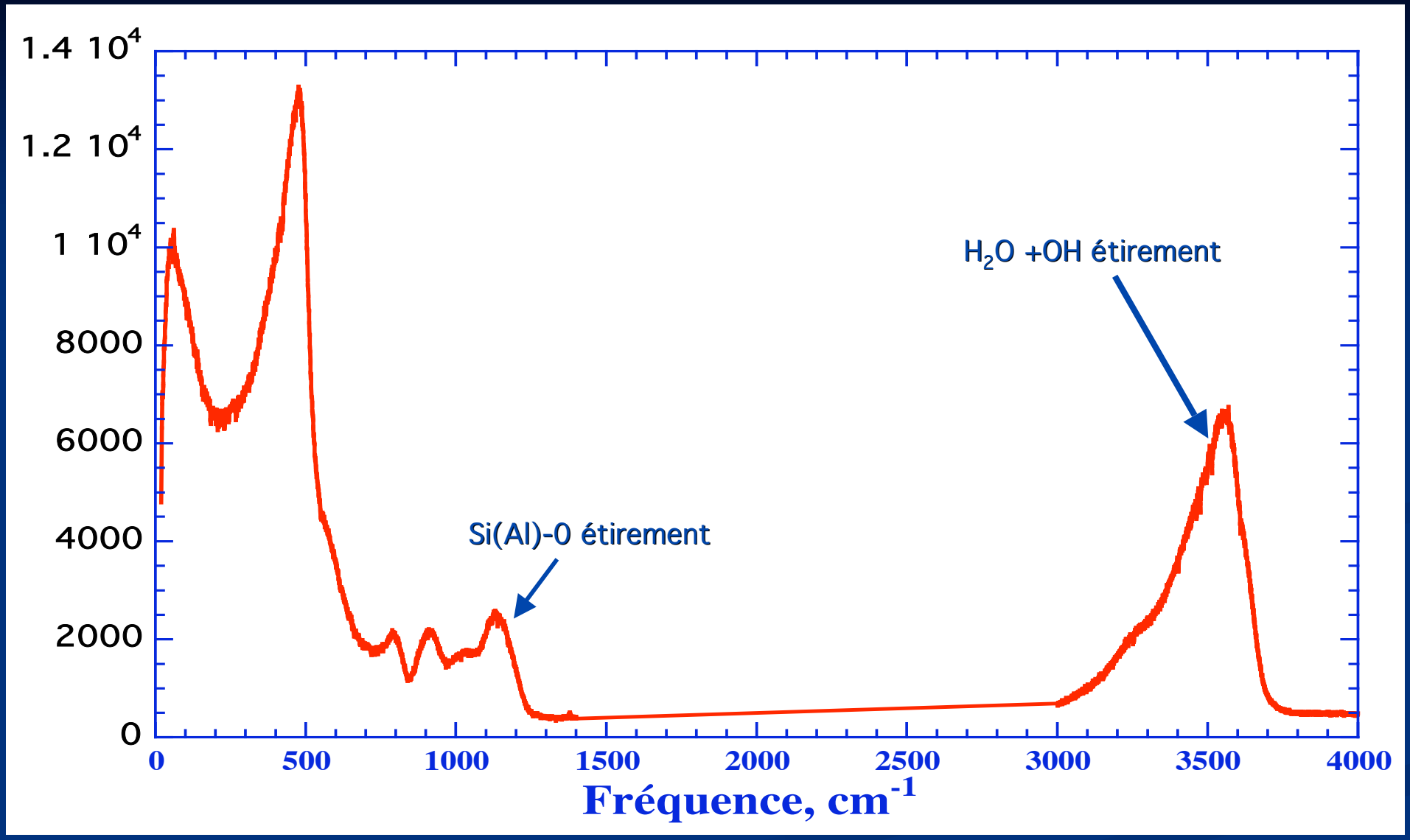




Long (1977) $I = I_{obs} * \nu_o^3[1-\exp(-hc\nu/kT)] \nu / (\nu_o-\nu)^4$



# Spectre Raman rhyolite avec 3%H2O

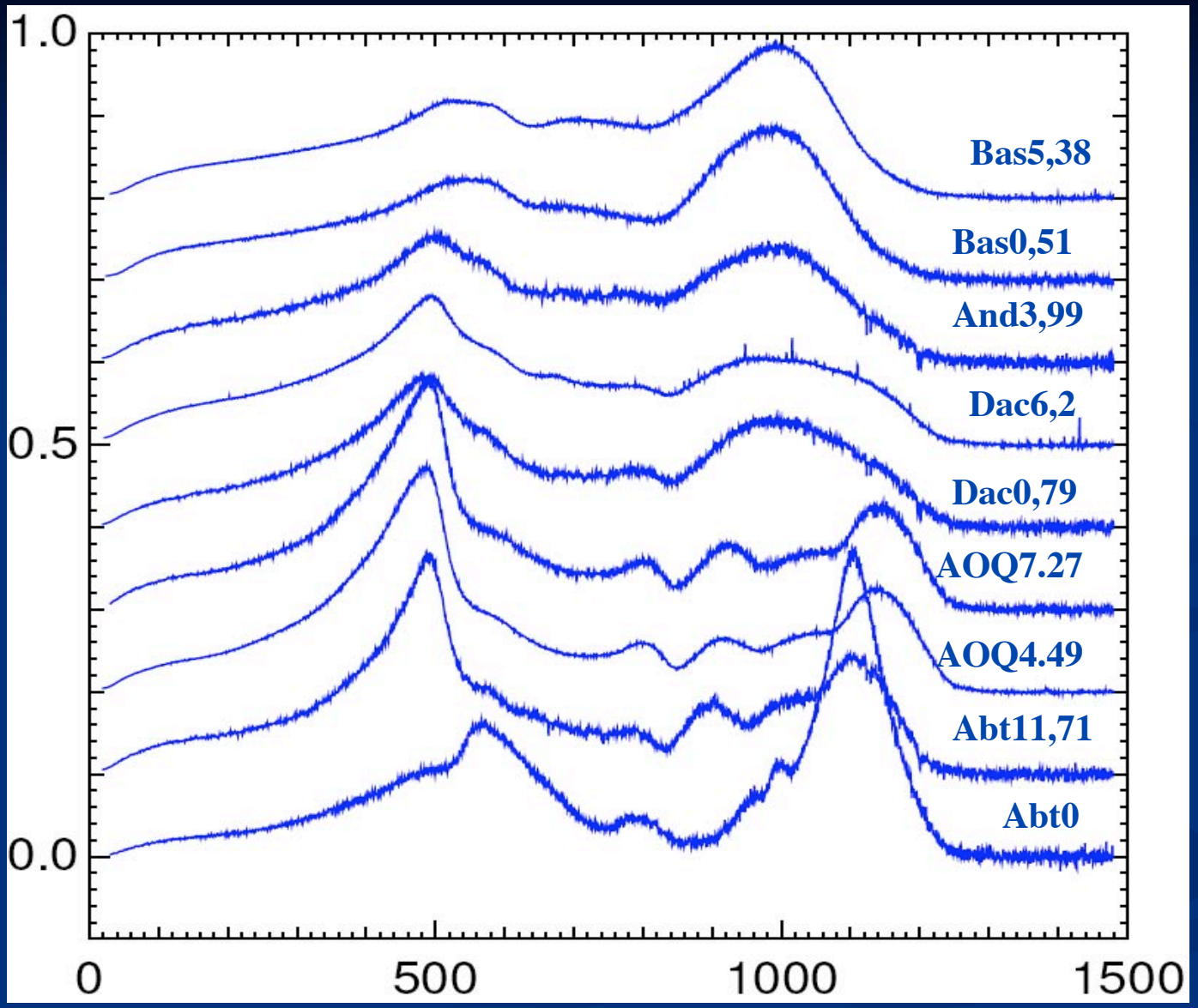


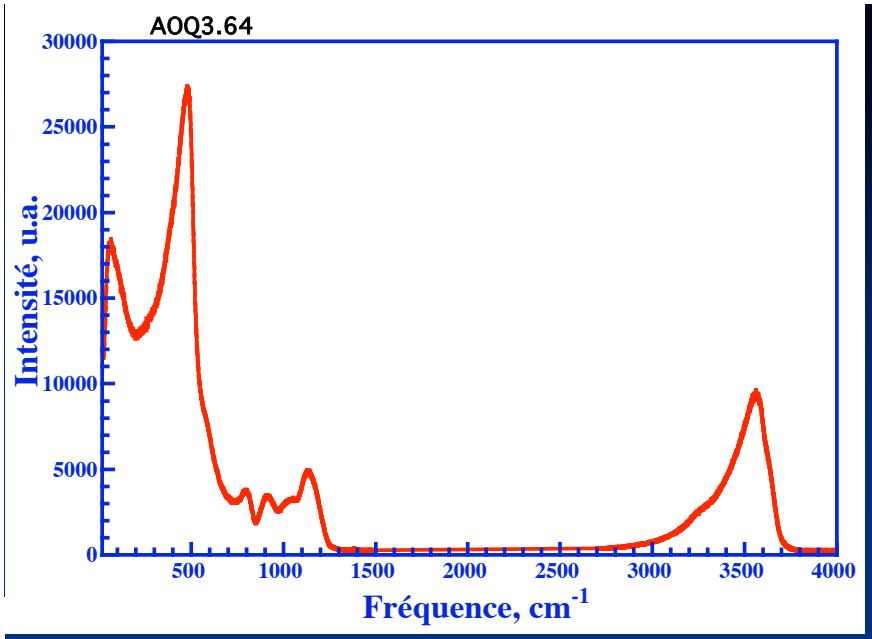

Behrens et al., Chem Geol (2006)

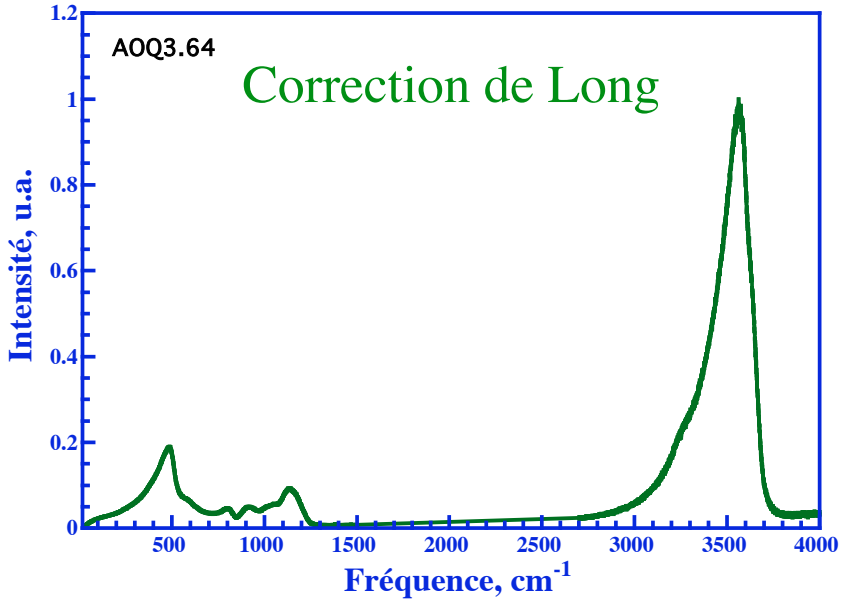
2 familles de silicates fondus

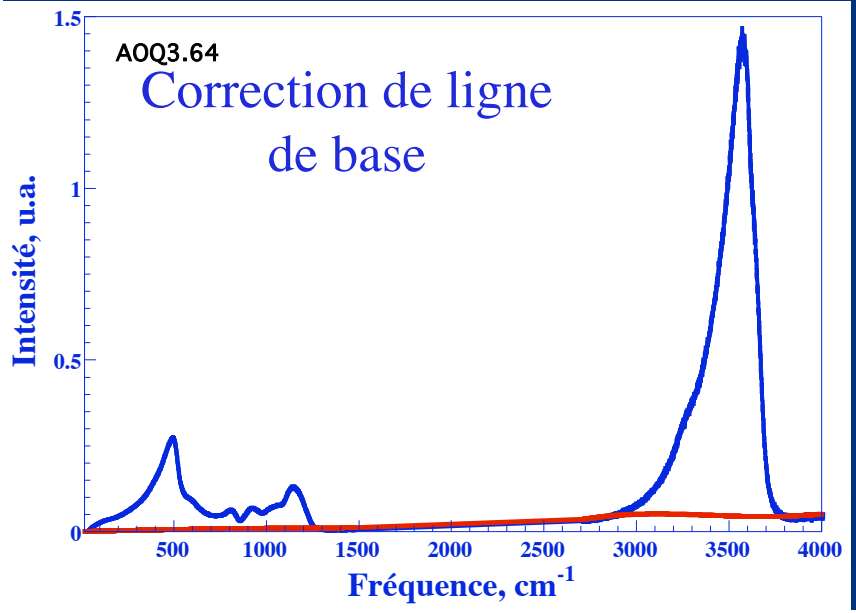
< 65 $SiO_2$
Verre anhydre dépolymérisé, $Q^1$, $Q^2$,$Q^3$

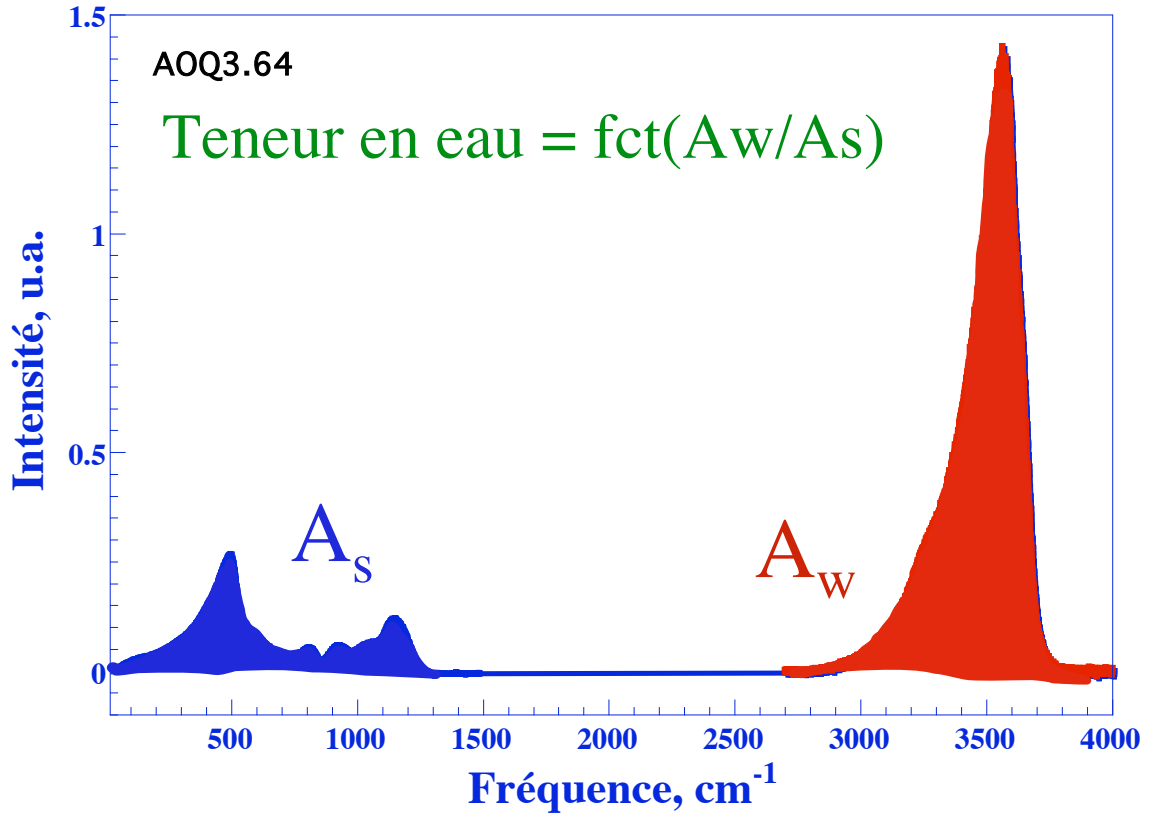
> 65 $SiO_2$
Verre anhydre fortement polymérisé, Majoritairement $Q^4$

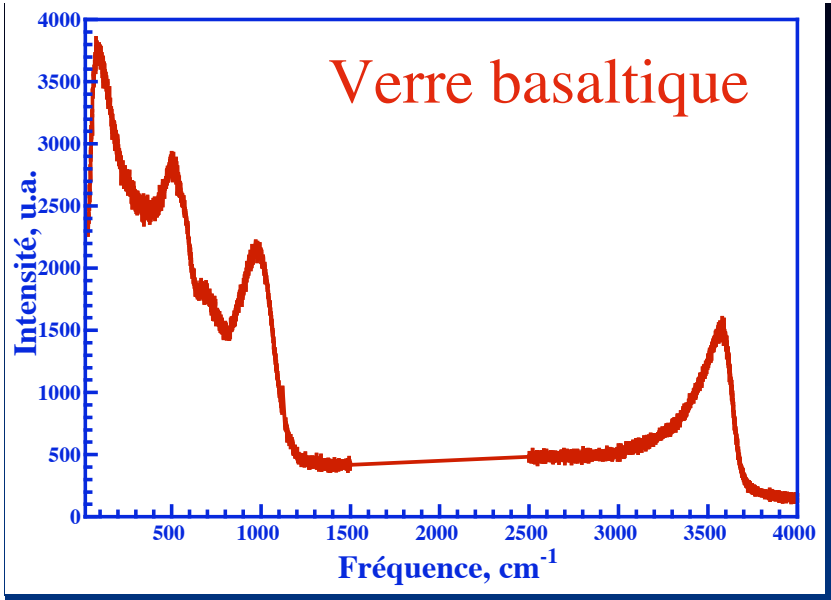


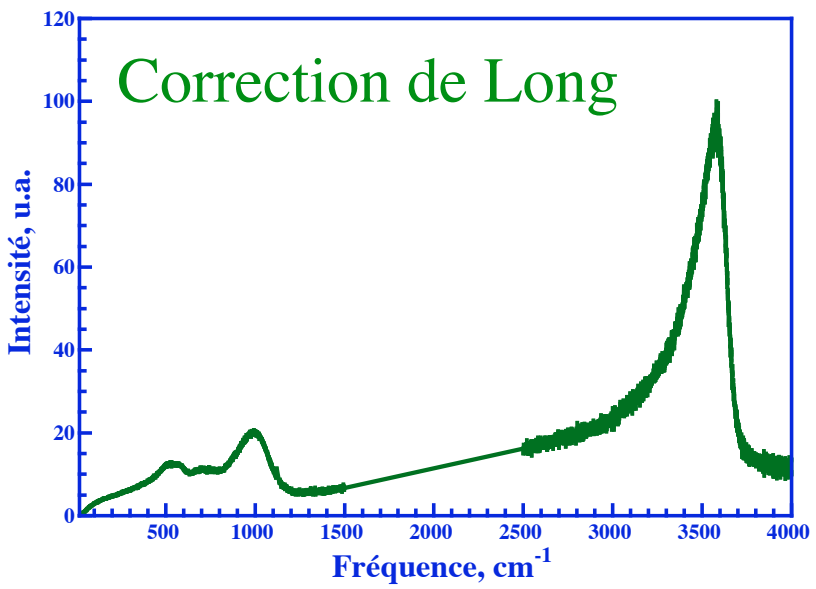

AOQ3.64
Intensité, u.a.
Fréquence, cm-1


AOQ3.64
Correction de Long
Intensité, u.a.
Fréquence, cm-1

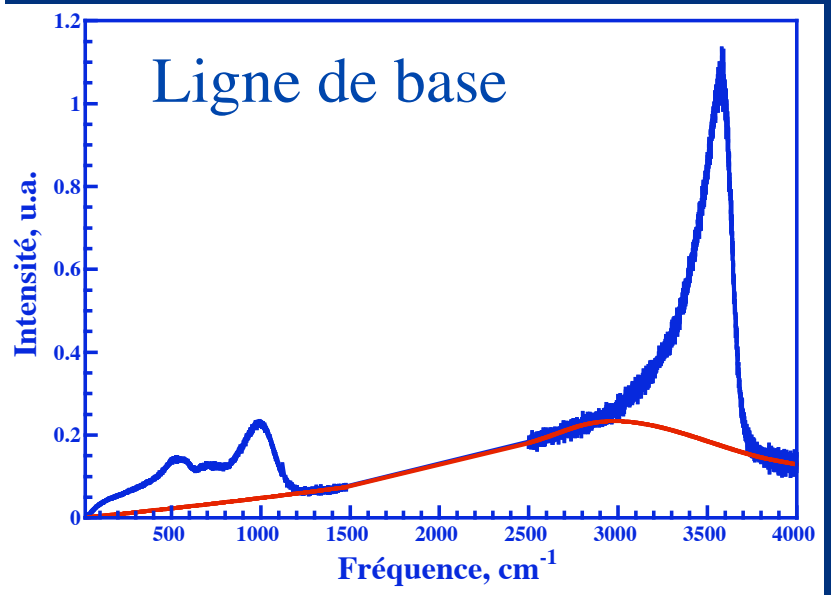

AOQ3.64
Correction de ligne
de base
Intensité, u.a.
Fréquence, cm-1

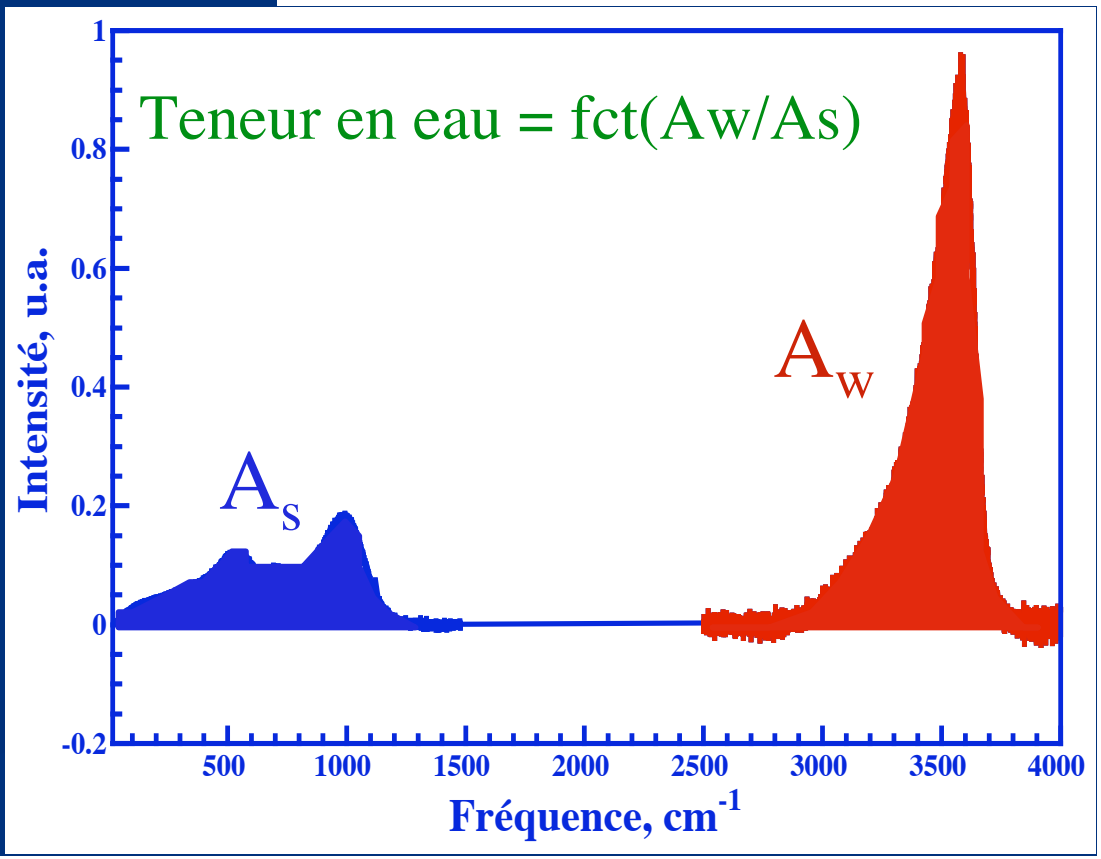

AOQ3.64
Teneur en eau = fct(Aw/As)
As
Aw
Intensité, u.a.
Fréquence, cm-1



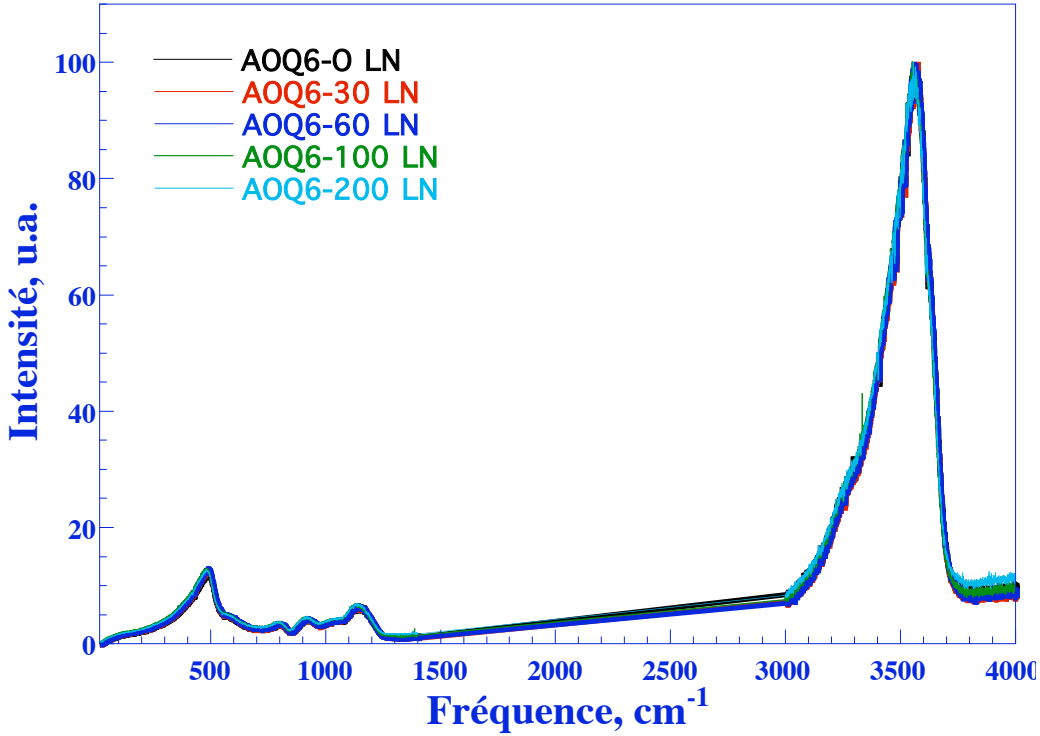




Behrens, Roux, Neuville Chem Geol (sous presse)



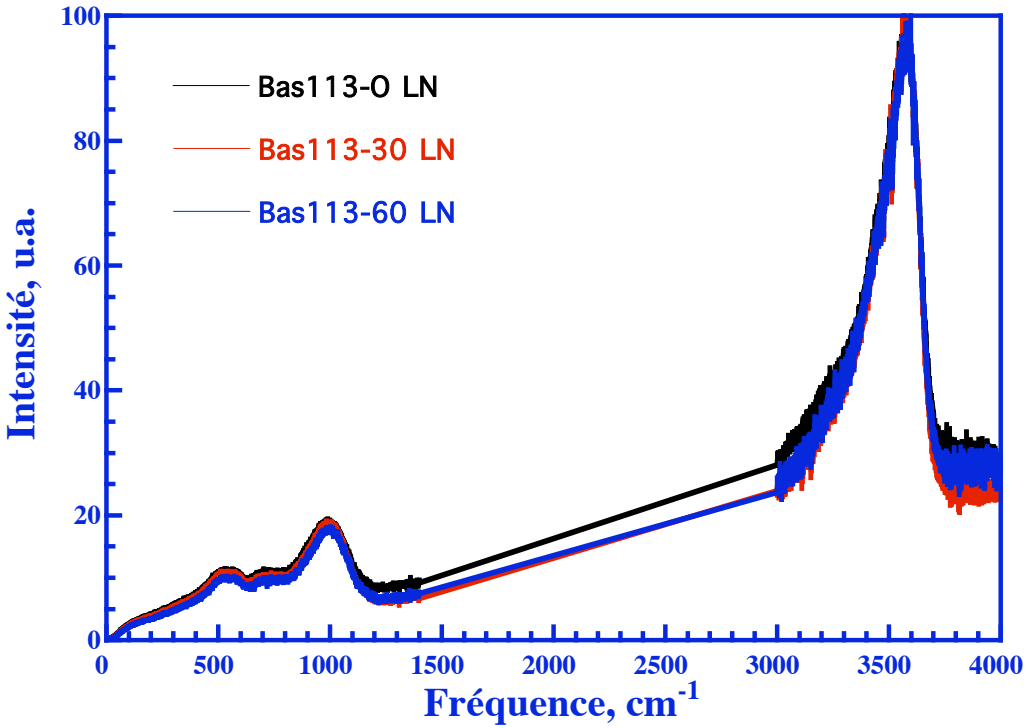



# Condition opératoire : effet de la profondeur du point de focalisation




=> Verre incolore = pas d'effet du point de focalisation

=> Verre noir = préférable de se focaliser en surface du verre



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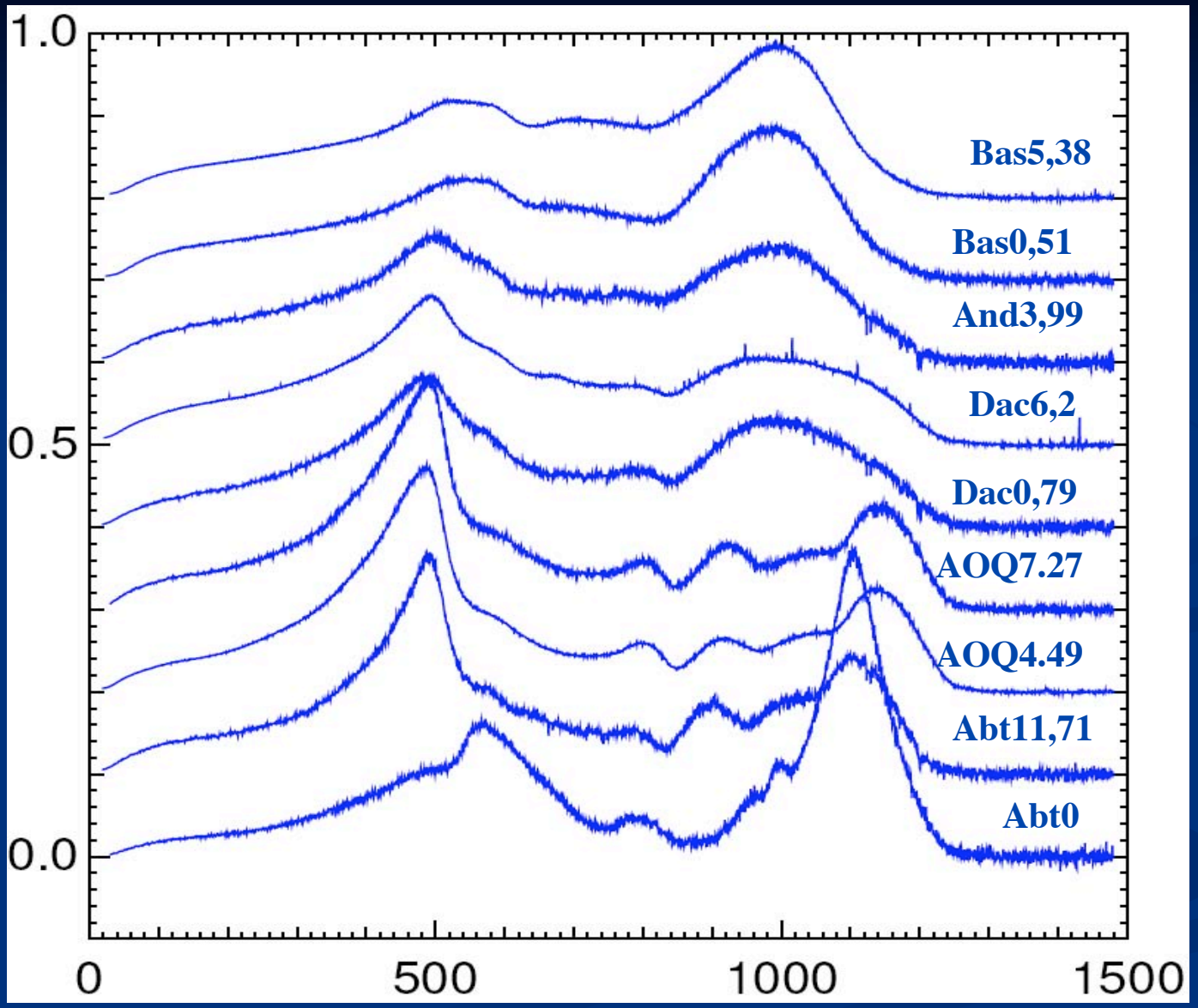

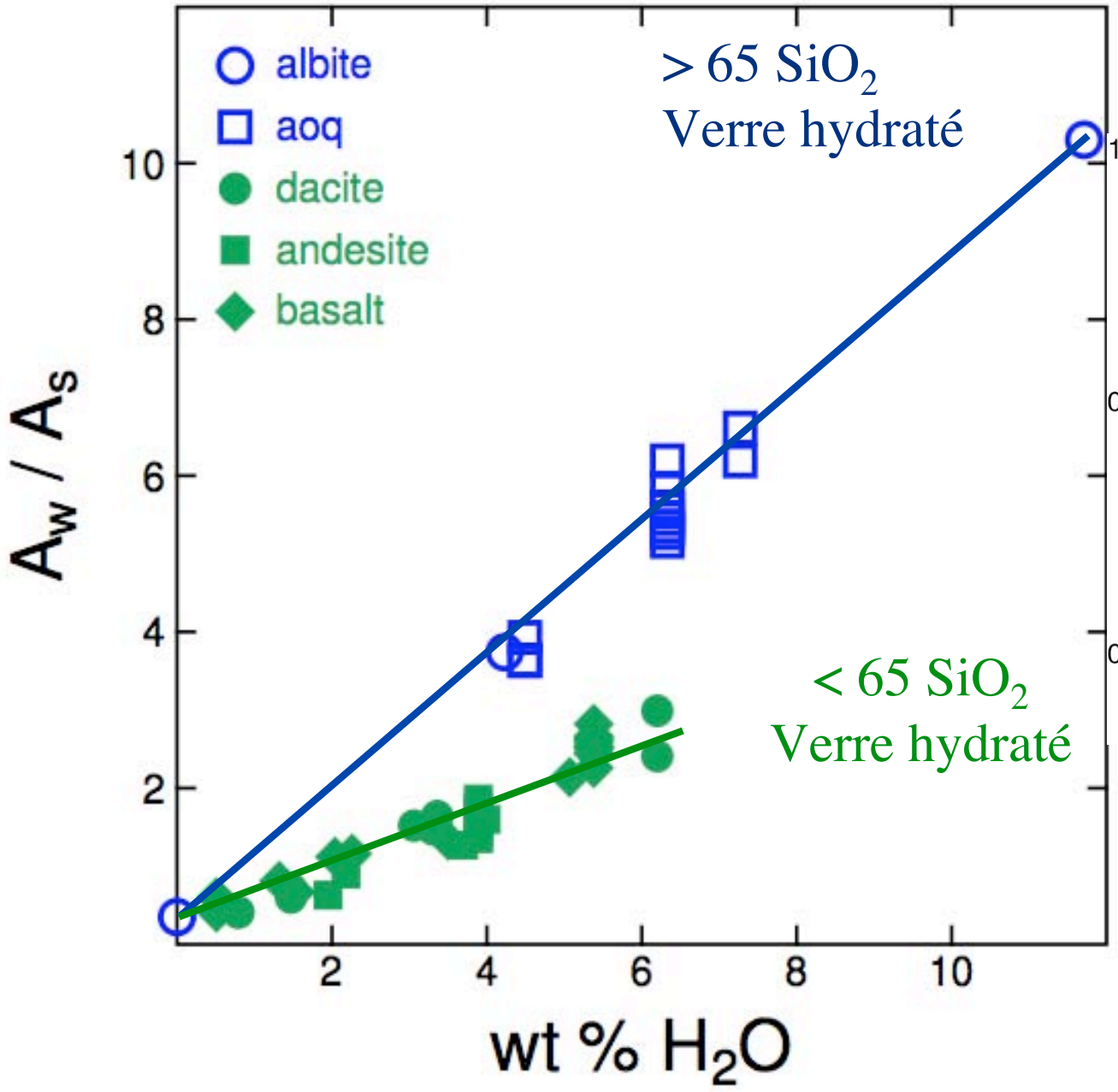


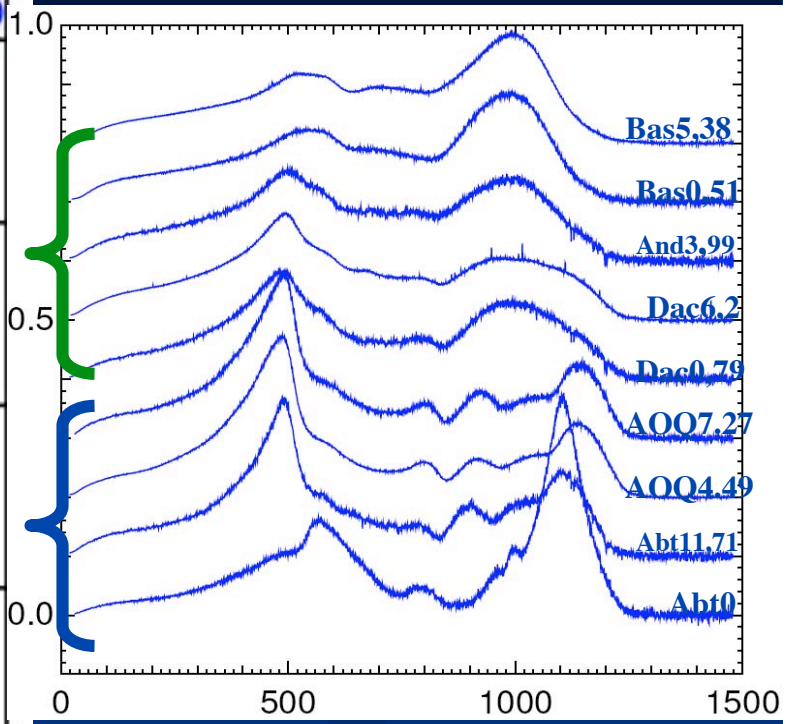


Dispersion résulte de spectre de qualité variable

# Conclusions

L'eau joue un rôle fondamentale sur les propriétés physiques et la structure des verres et des silicates fondus.

Possibilité de déterminer la teneur en eau dissoute dans un verre à l'aide de la spectrométrie Raman sans préparation au préalable. Mais nécessite deux calibrations en fonction de la teneur en silice.