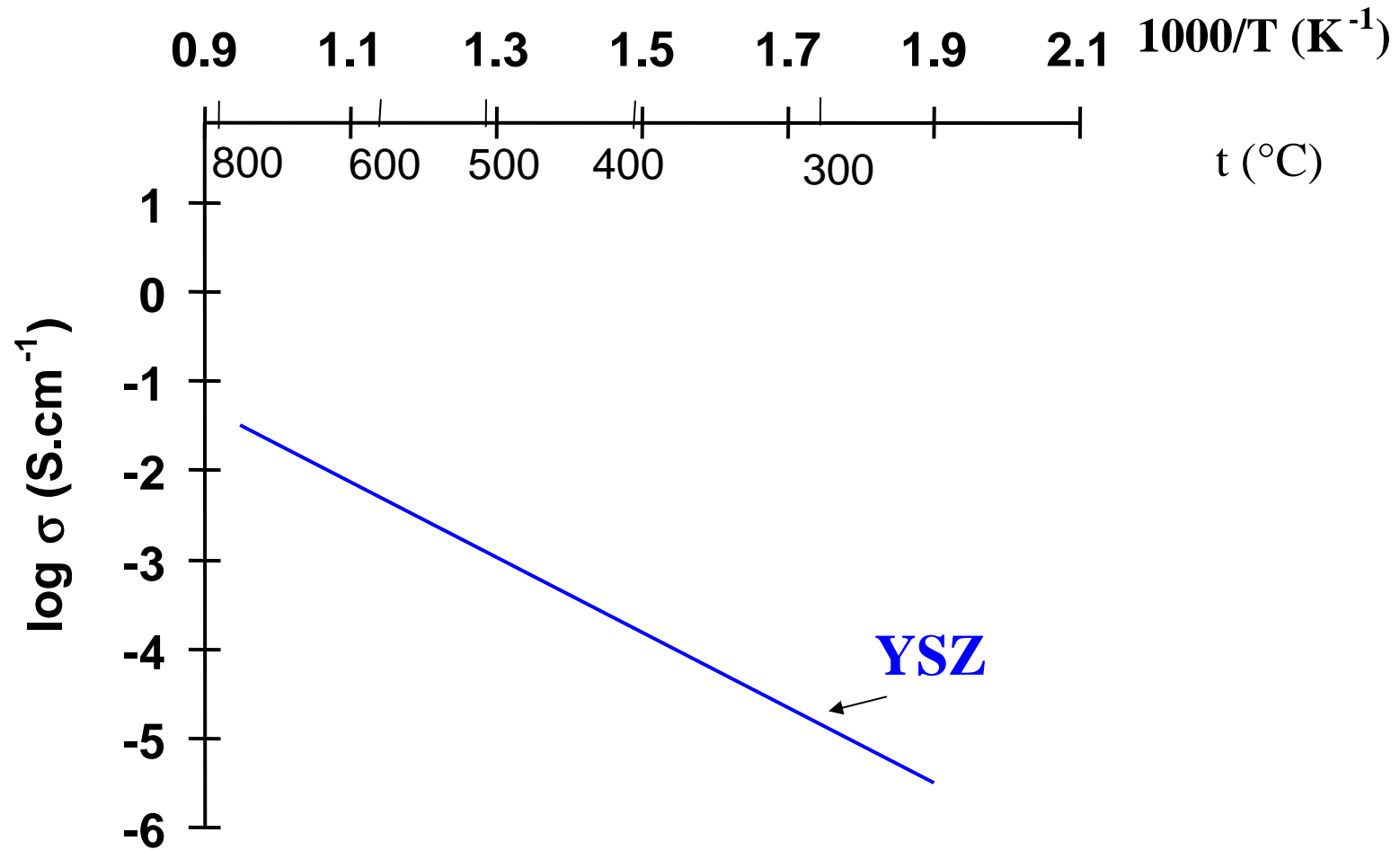


Electrolytes solides nanocristallins à base d'oxyde de bismuth

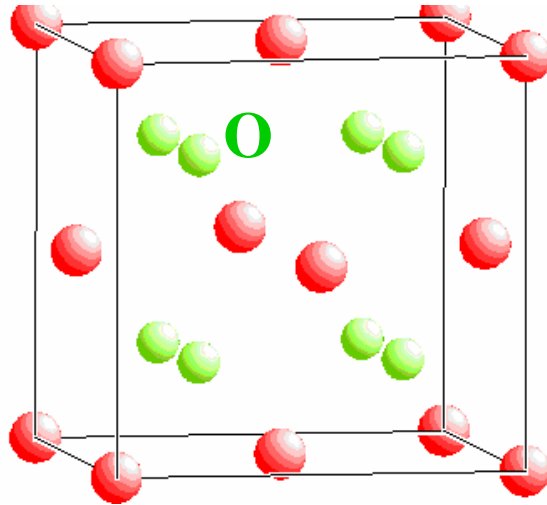
Rong Li^{1,2}, Qiang Zhen², Michel Drache², Rose-Noëlle Vannier

¹Unité de Catalyse et de Chimie du Solide - UMR CNRS 8181, ENSCL
Bâtiment C7 – BP 90108 – 59652 Villeneuve d'Ascq Cedex, France

²Nano-science and Nano-technology Research Center, School of Materials
Science and Engineering, Shanghai University, Shanghai 200444, P. R. China

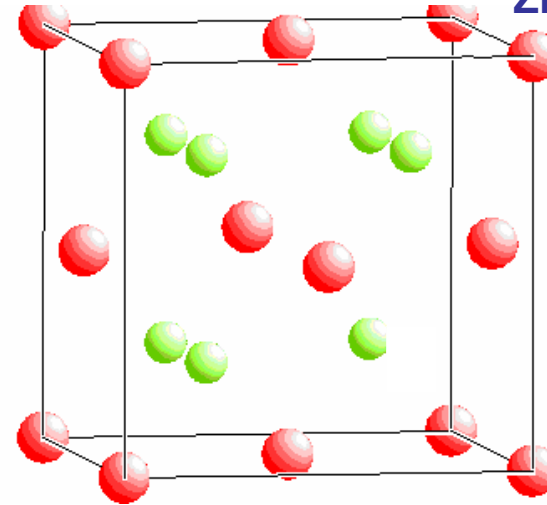


Zr



ZrO₂

Y_{Zr}'

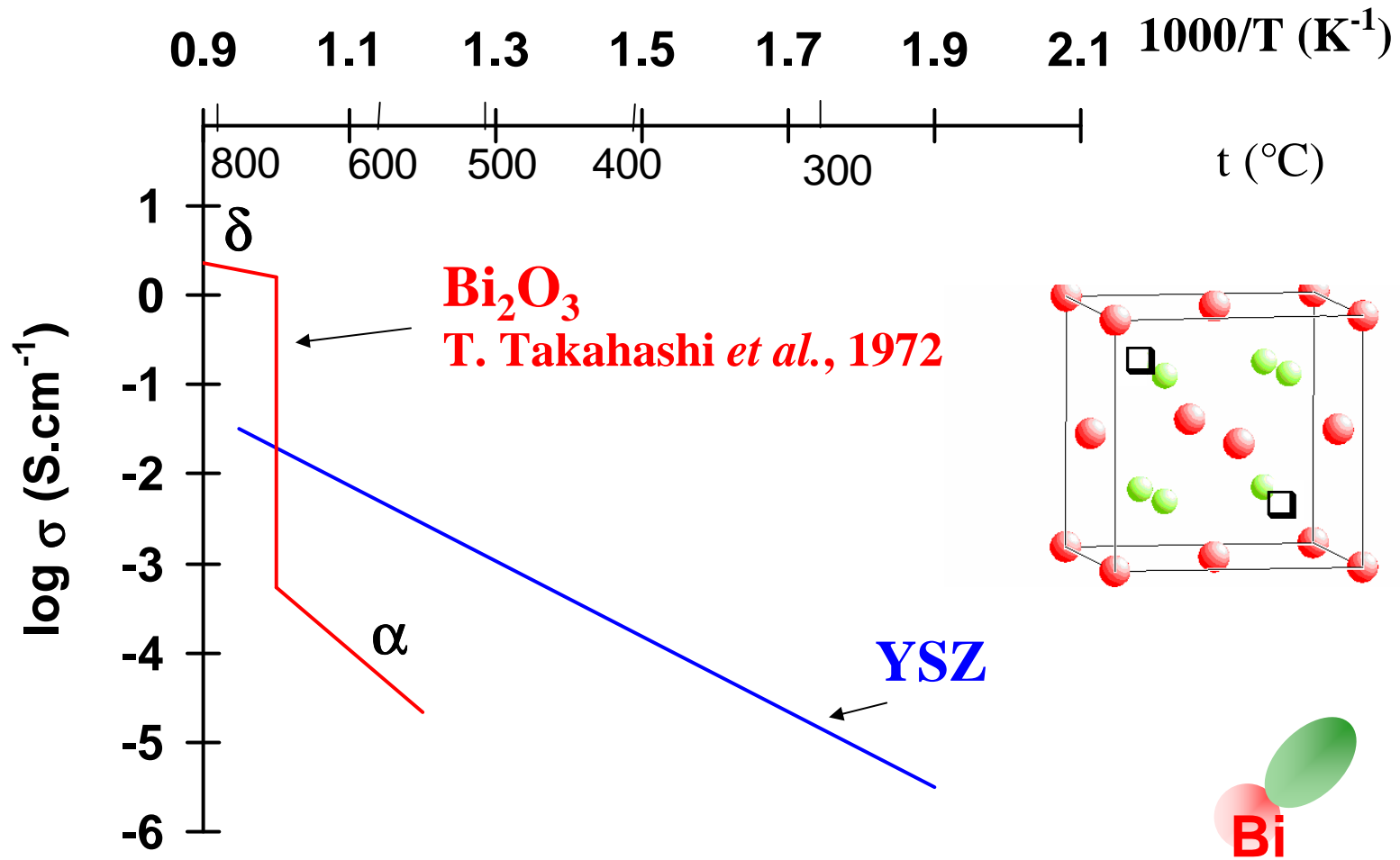


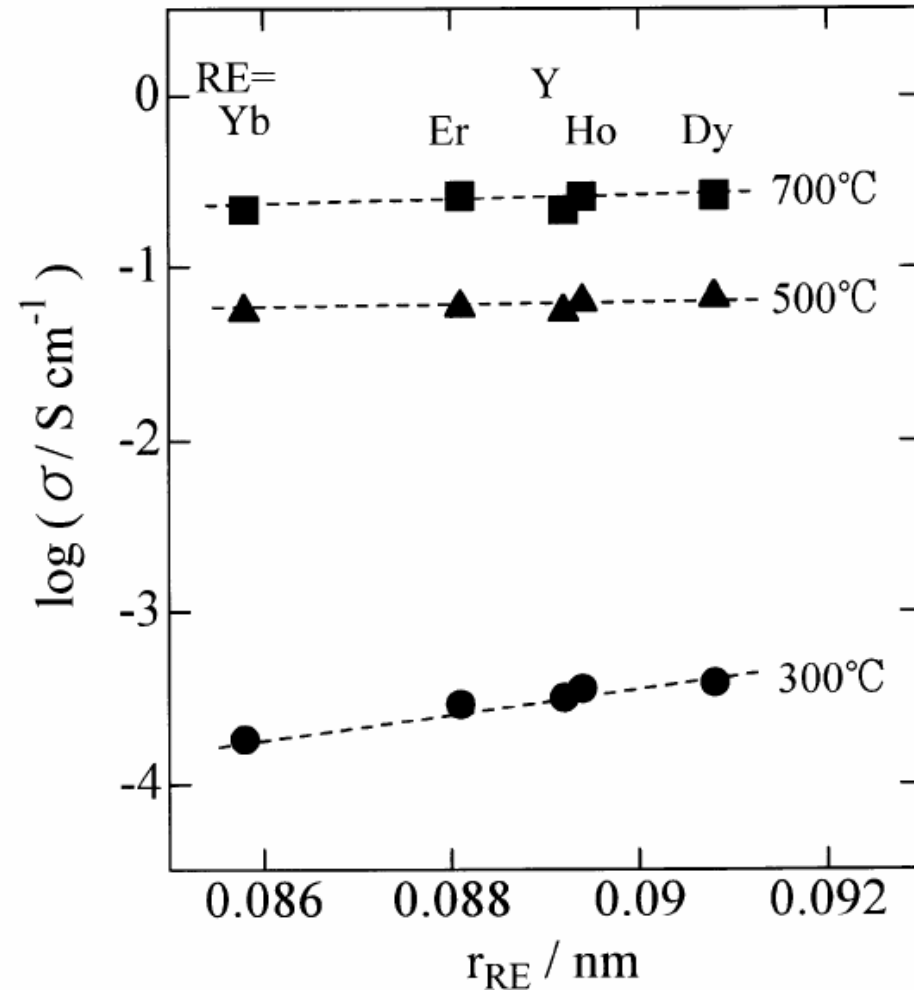
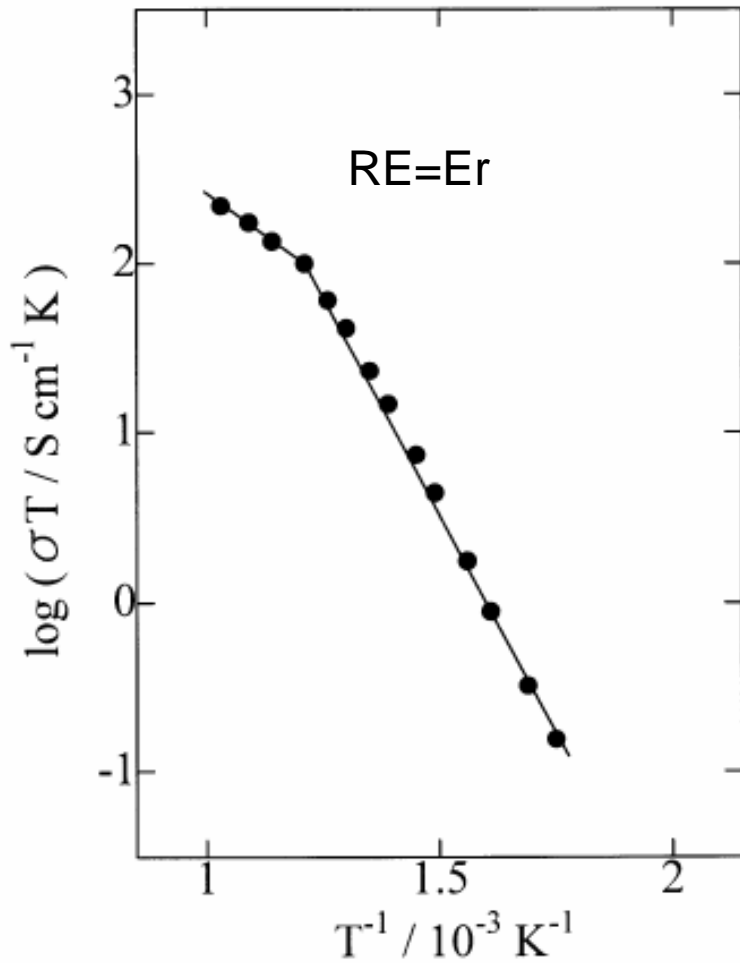
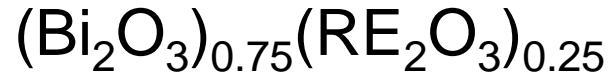
Y^{III} → [Zr^{IV}]

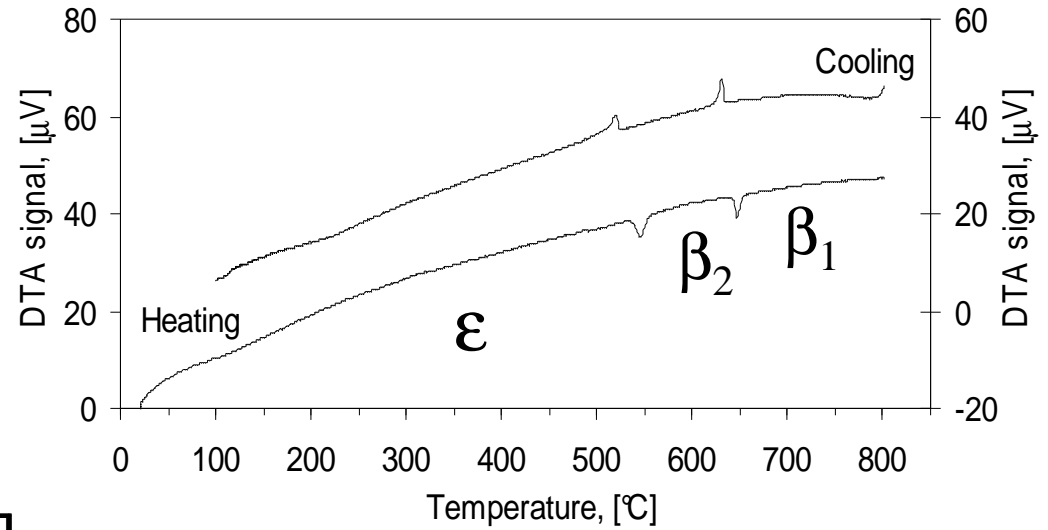
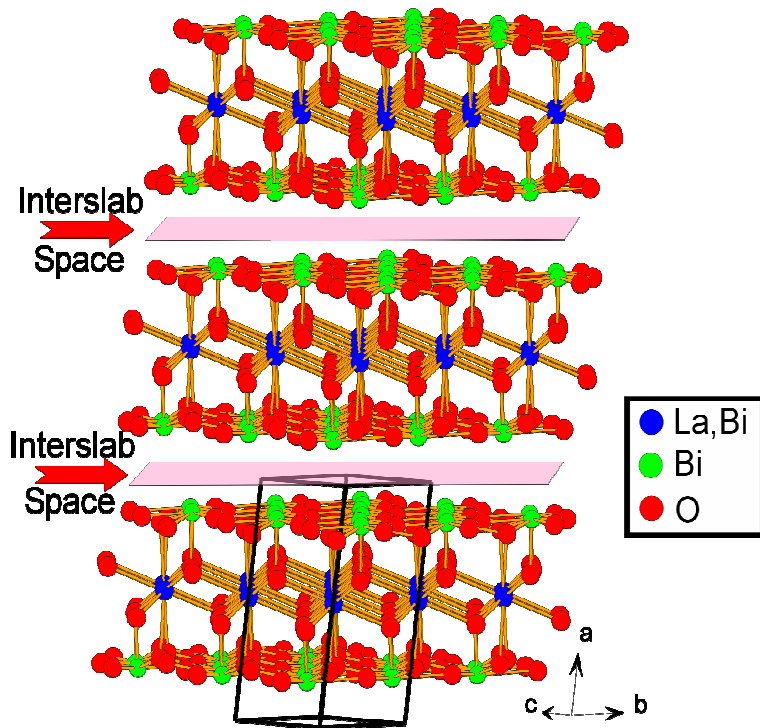
=> lacune d'oxygène

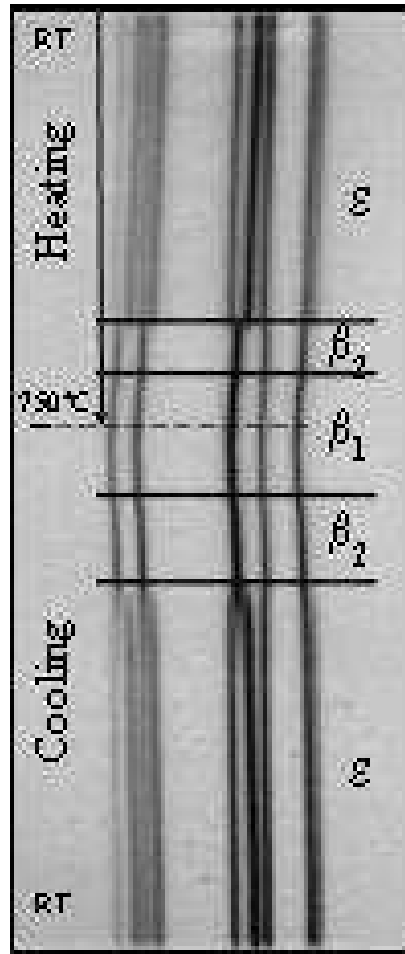
=> zircone stabilisée







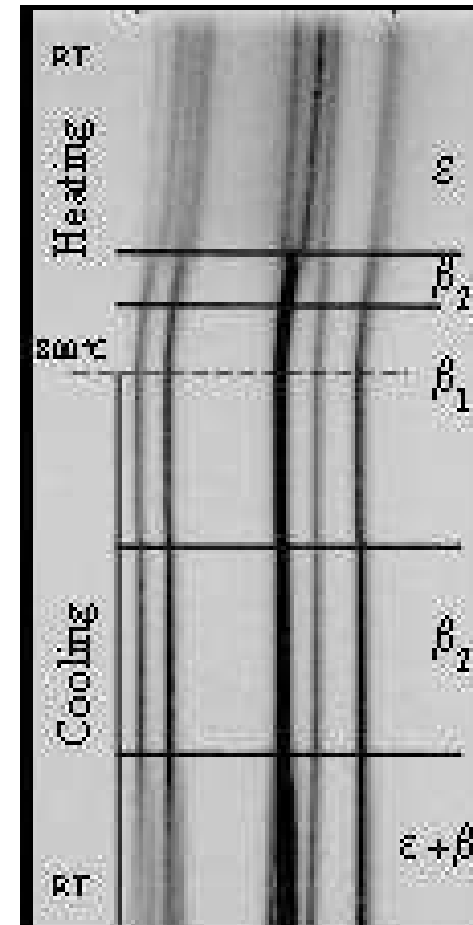
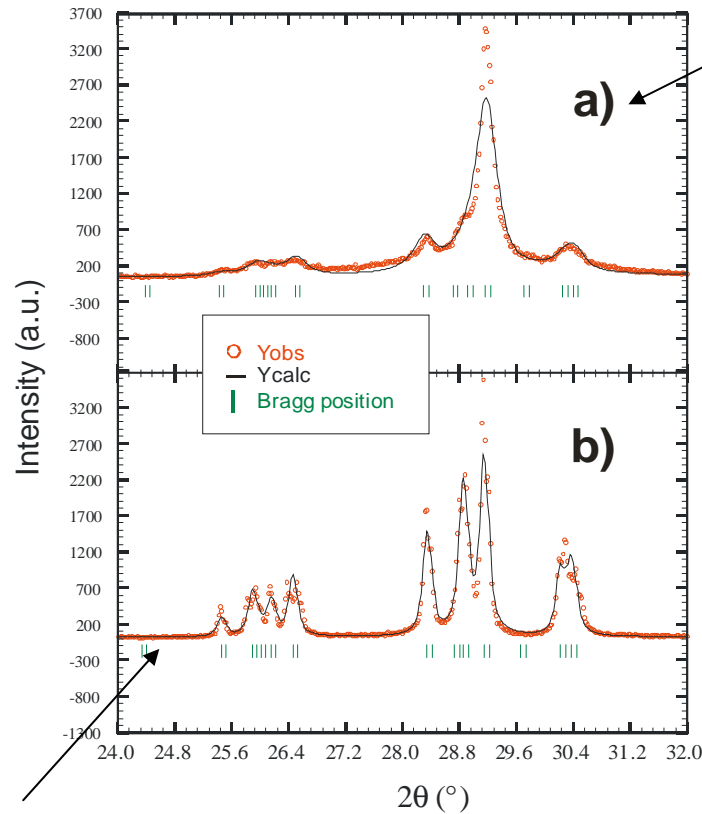


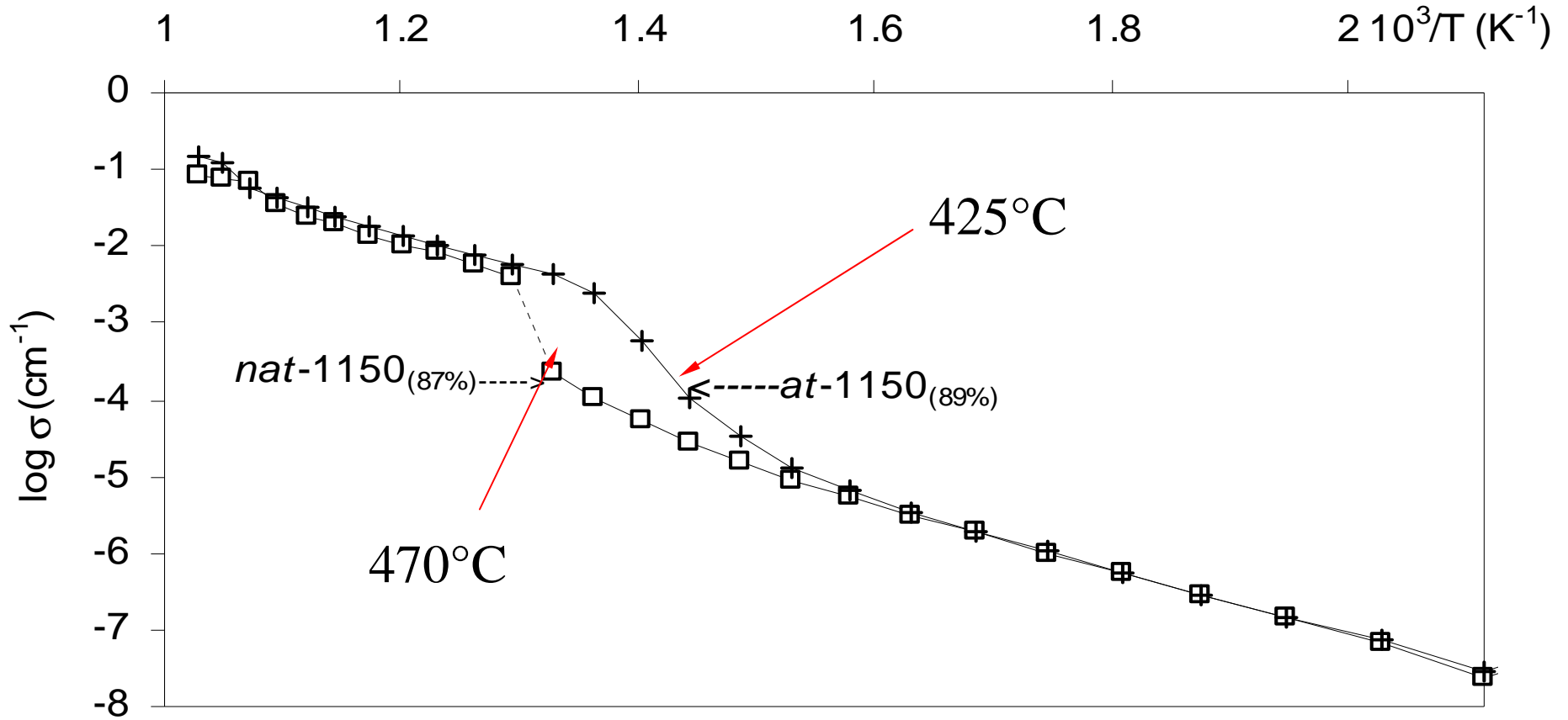


powder as prepared by solid state route

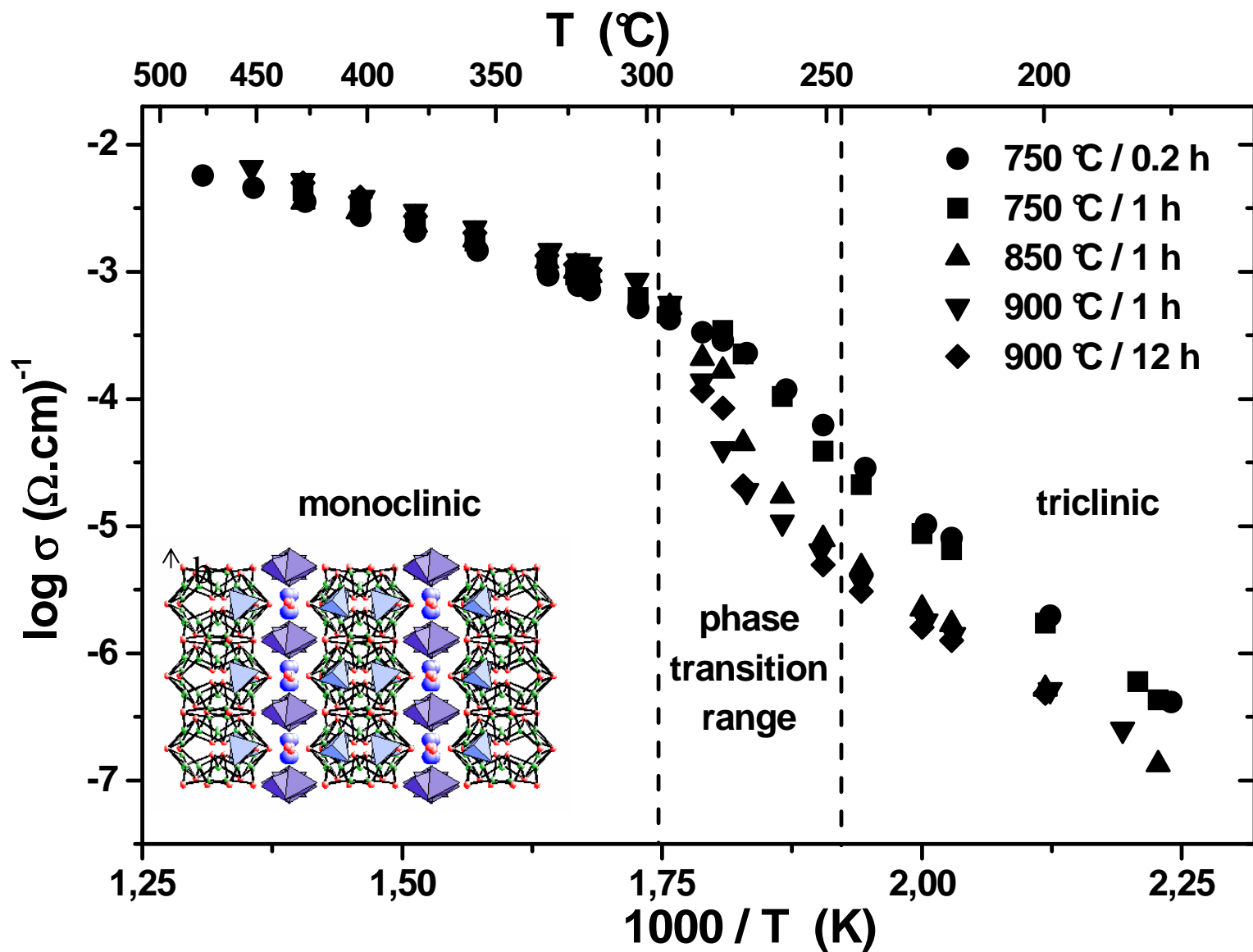
X-ray

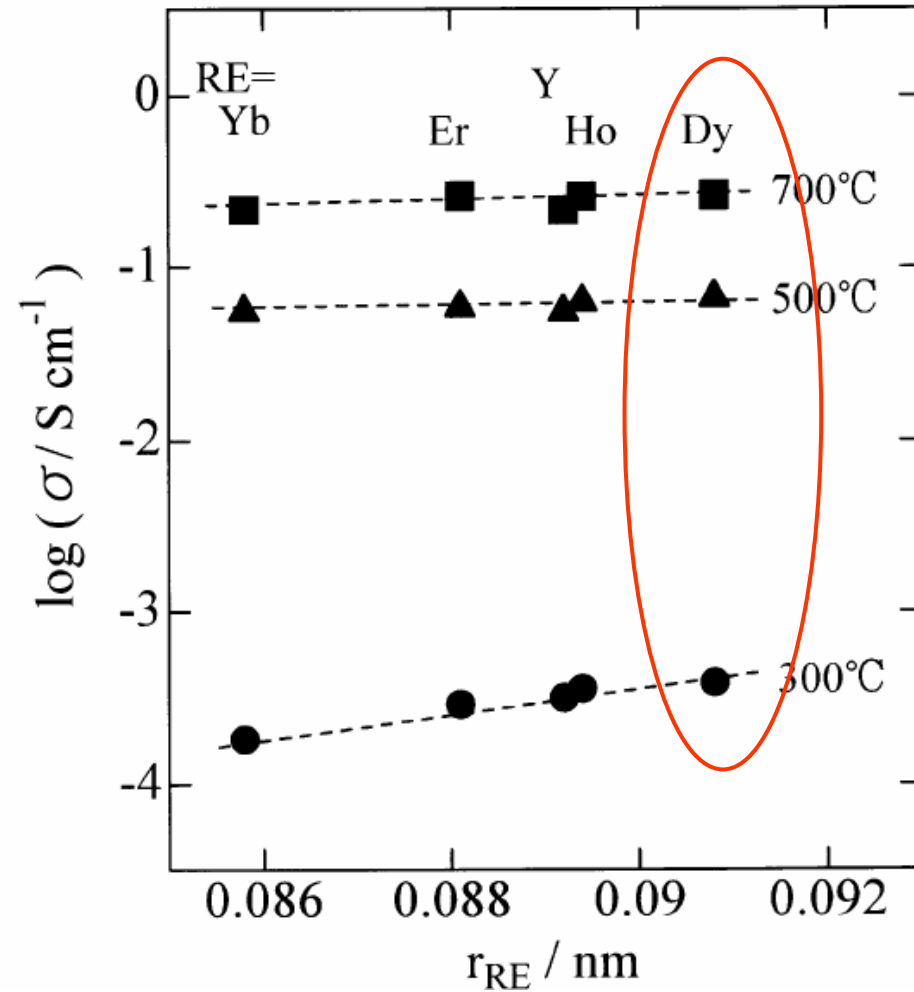
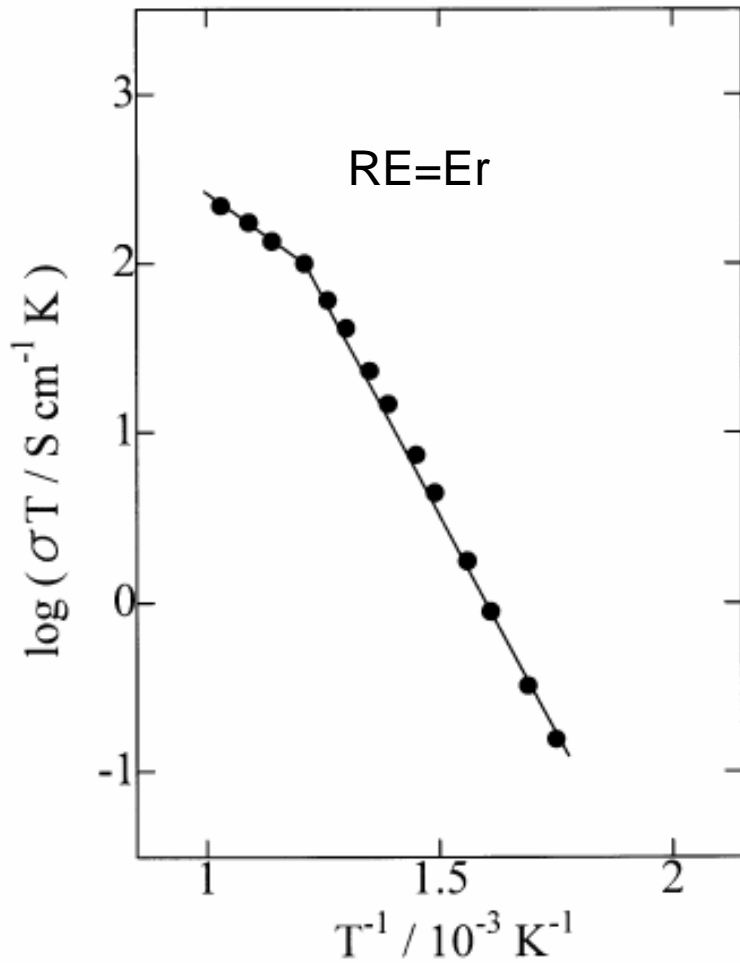
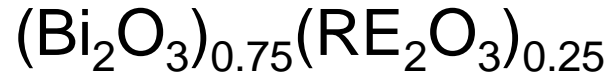
Attrition milled powder





Bi₂₆Mo₉W₁₀O₆₉: effet de la taille des grains



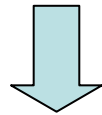


- Préparation de poudres à grain de taille nanométrique
- Frittage conventionnel
- Frittage Flash SPS
- Conclusion et perspectives

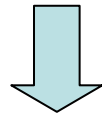




solution de nitrate de Bi, Dy (0,1 mol/L)



ammoniaque (pH ~ 11.5)



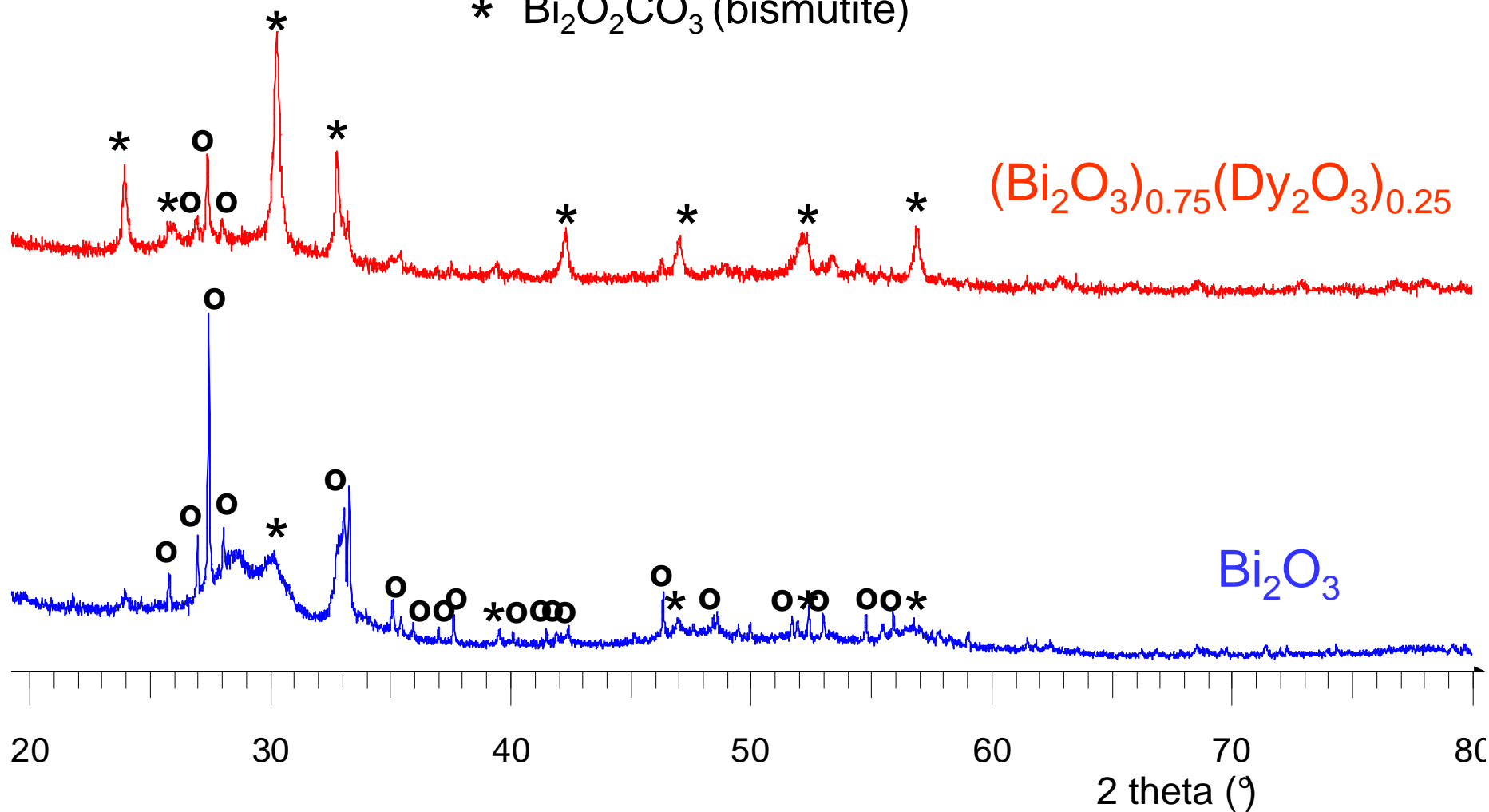
poudre

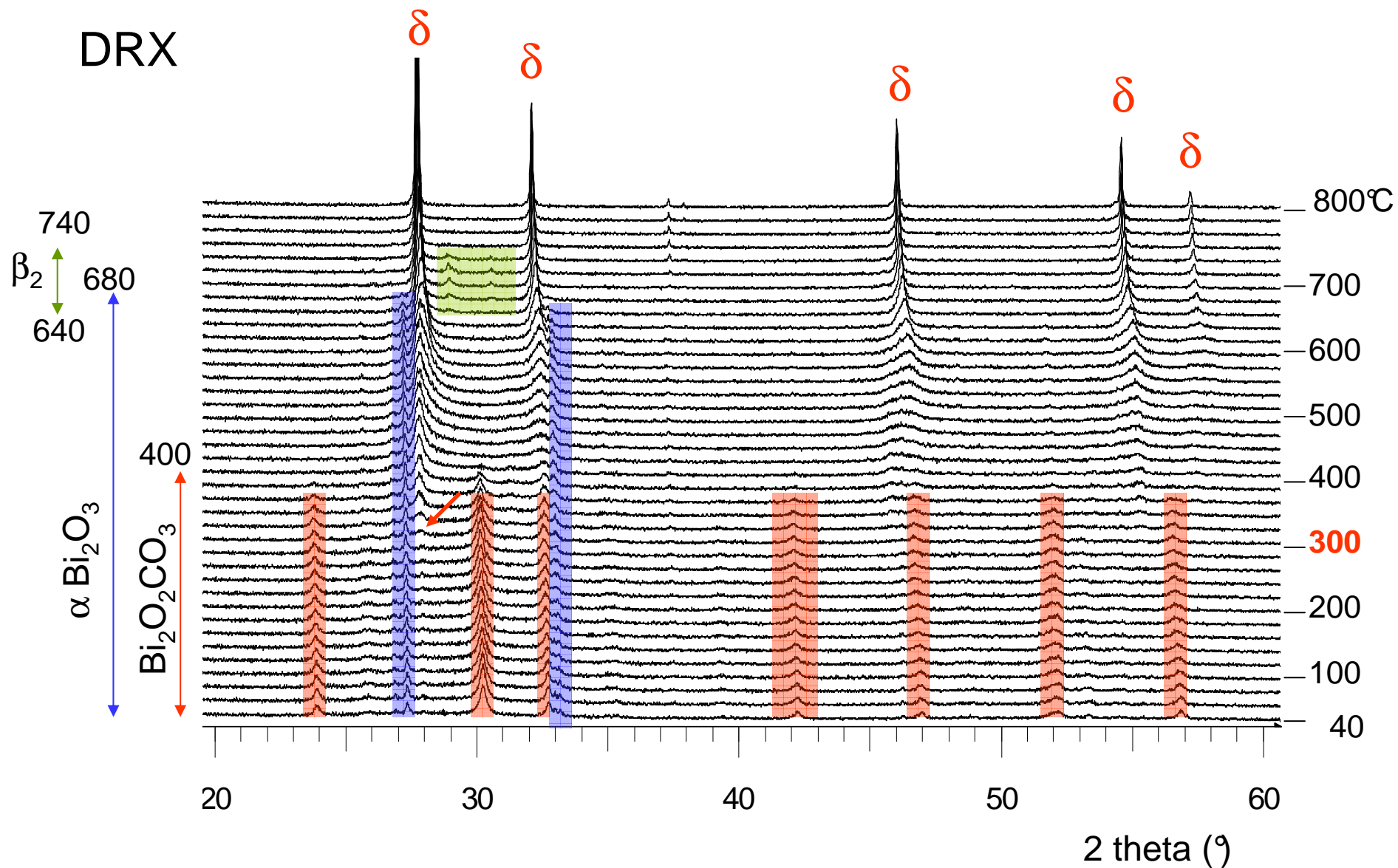
$\text{Bi}_2\text{O}_3 - (\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ - précurseurs

DRX

○ $\alpha \text{Bi}_2\text{O}_3$ (bismite)

* $\text{Bi}_2\text{O}_2\text{CO}_3$ (bismutite)

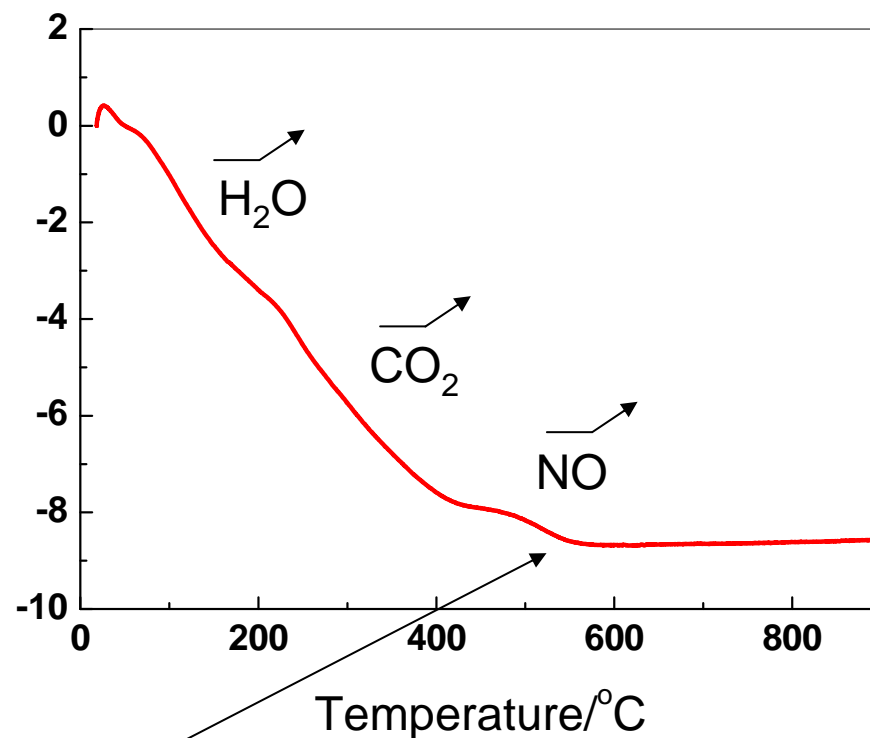
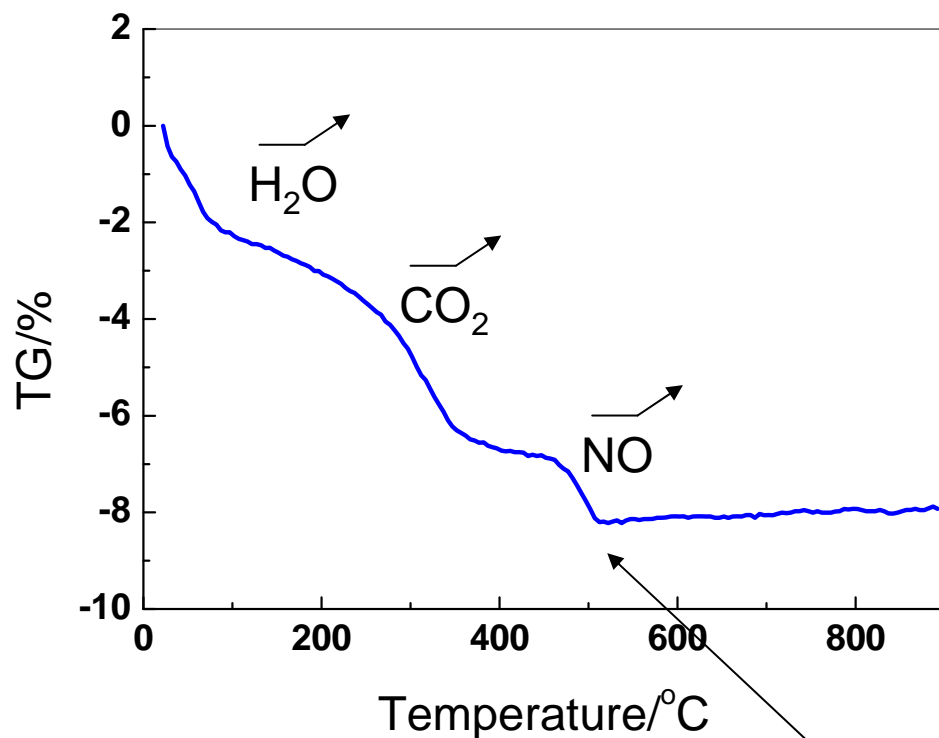




ATG couplée spectrométrie de masse

Bi_2O_3

$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$

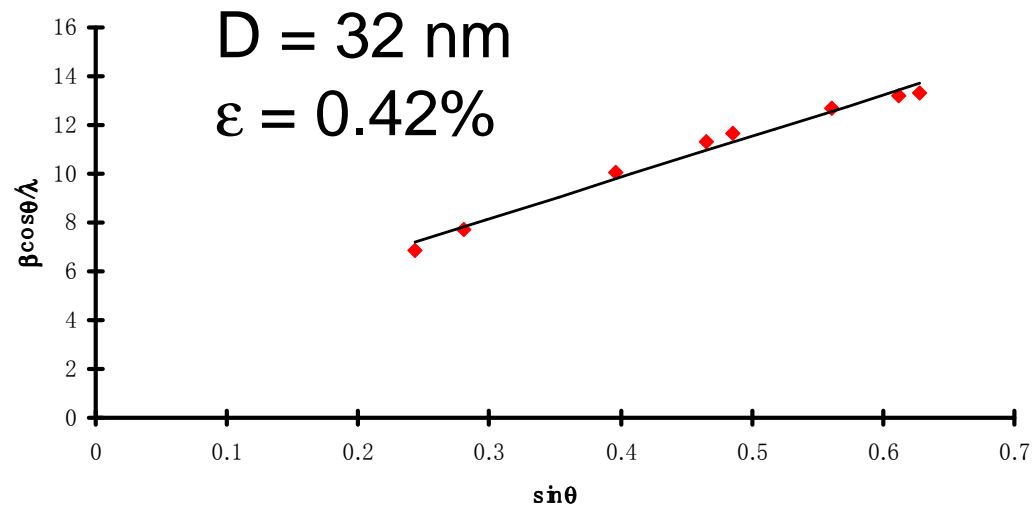


500°C

$\text{Bi}_2\text{O}_3 - (\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ après calcination

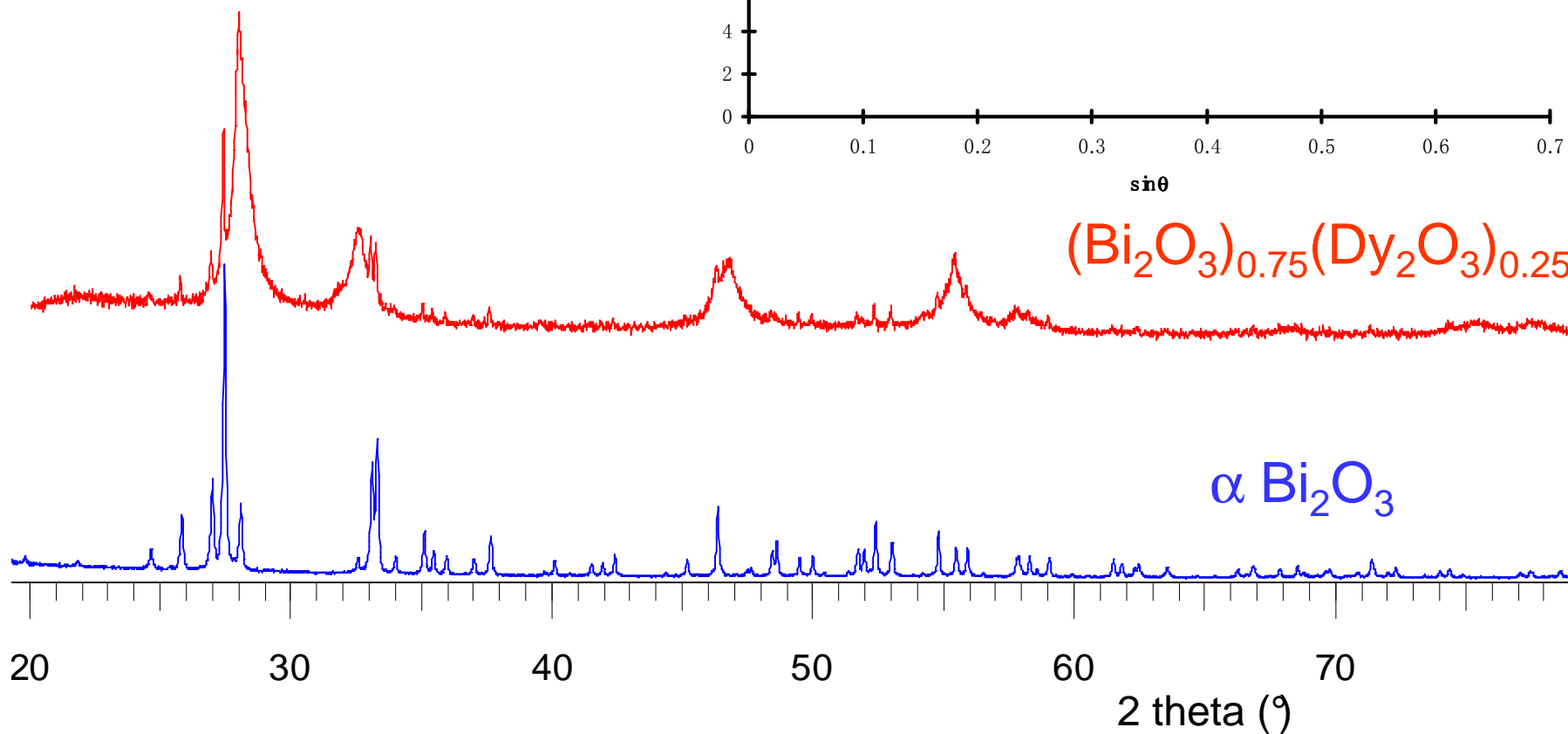
DRX après recuit 3h à 500°C

10% $\alpha\text{-Bi}_2\text{O}_3$ + 90% $\delta\text{-Bi}_2\text{O}_3$



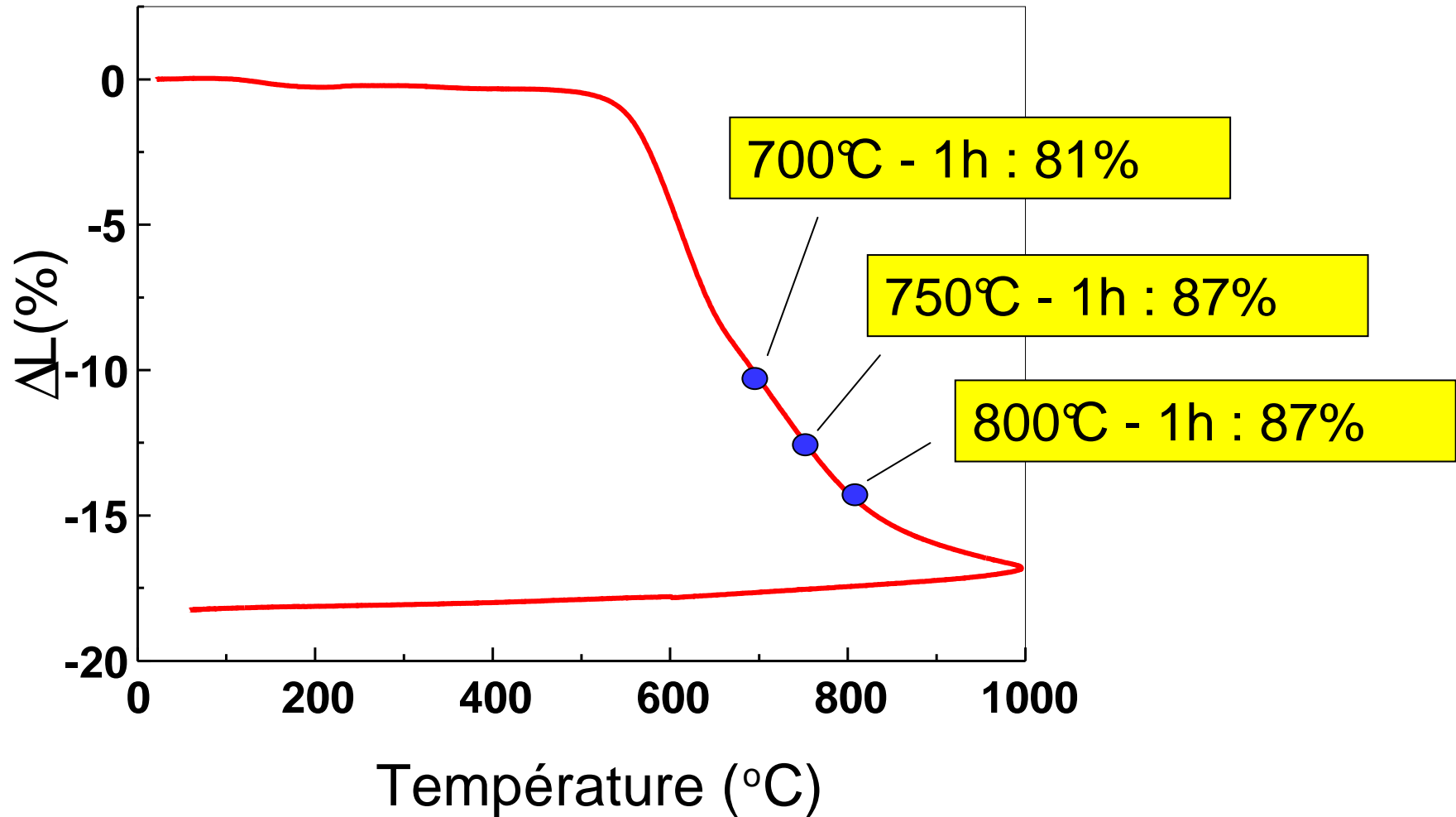
$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$

$\alpha \text{ Bi}_2\text{O}_3$



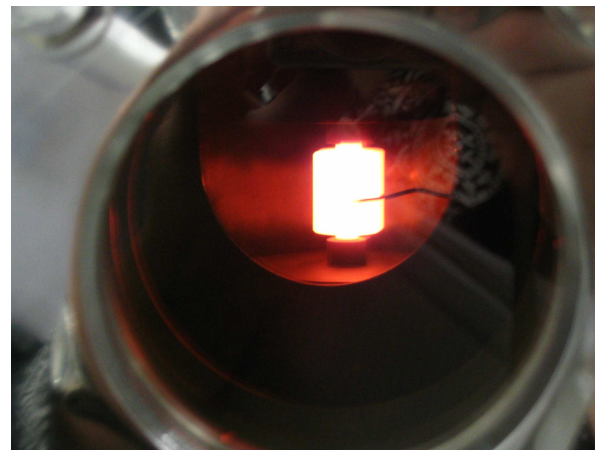
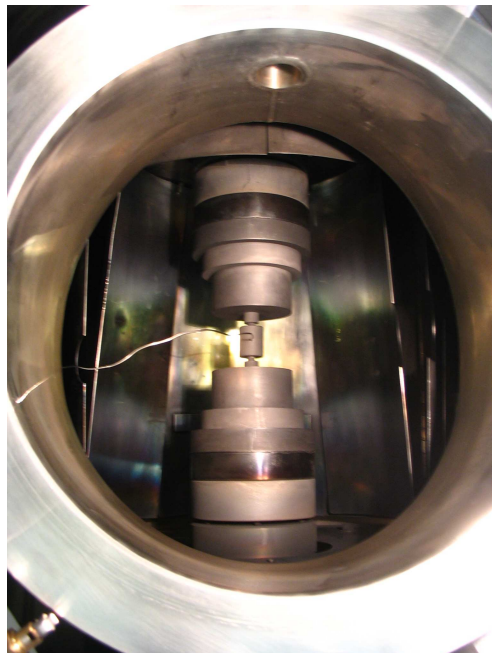
$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$: frittage conventionnel

$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ 500°C – 3h



UCCs

Frittage Flash - SPS

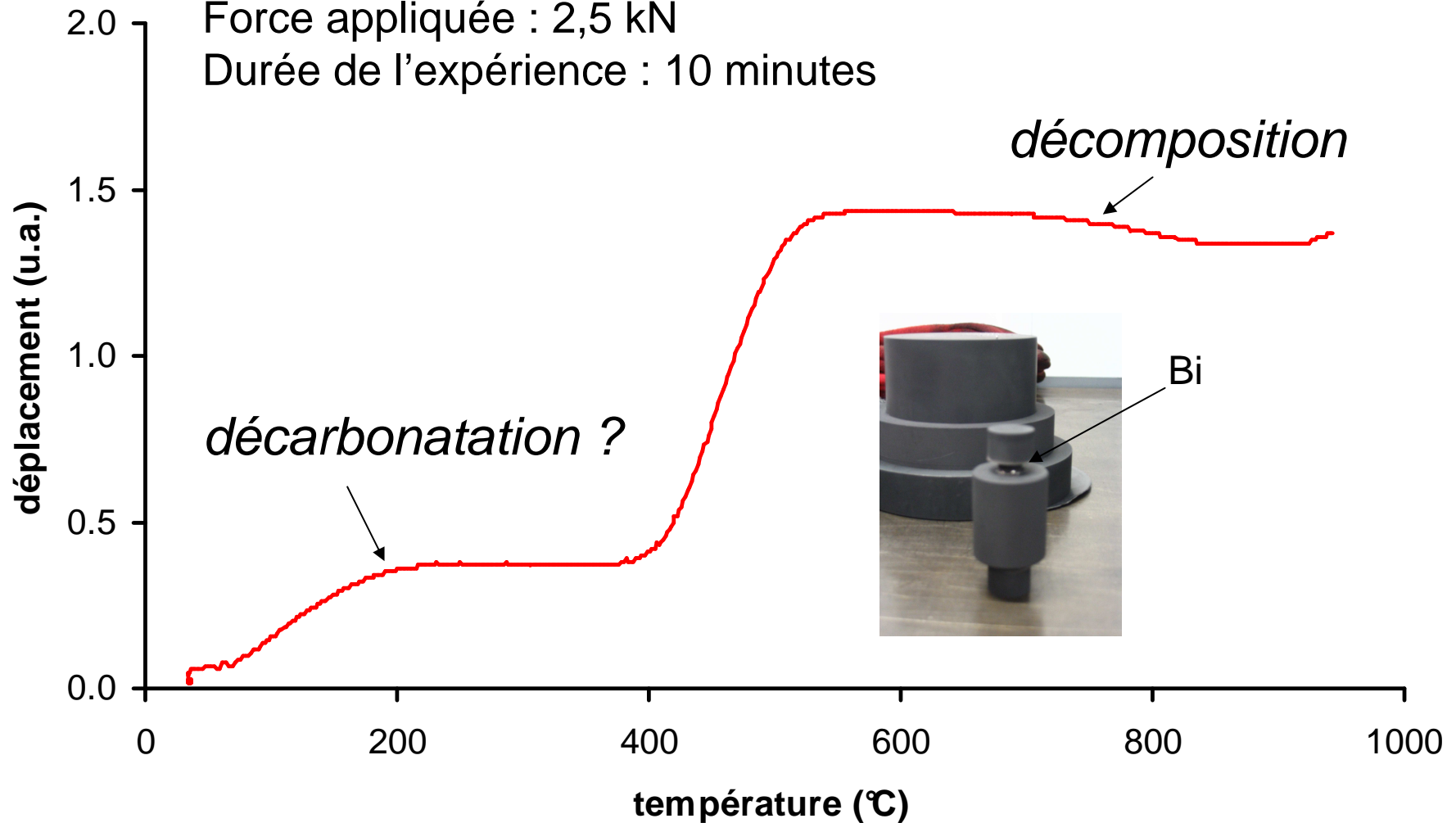


Claude Estournes
Geoffrey Chevalier

Frittage Flash – SPS- $(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$

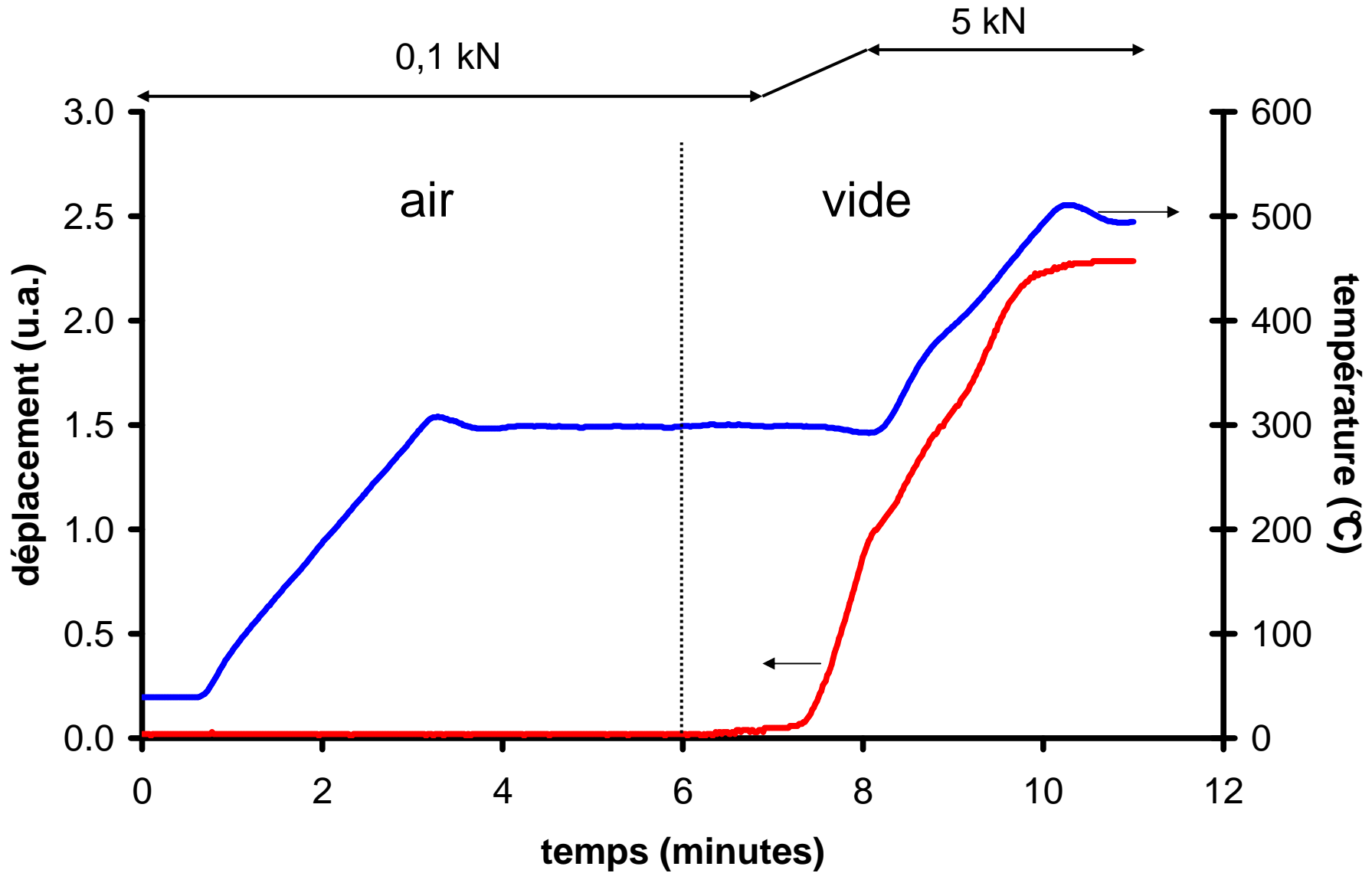
$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ 500°C – 3h

Pression : 2-3 Pa Ar
 Force appliquée : 2,5 kN
 Durée de l'expérience : 10 minutes



Frittage Flash – SPS- $(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$

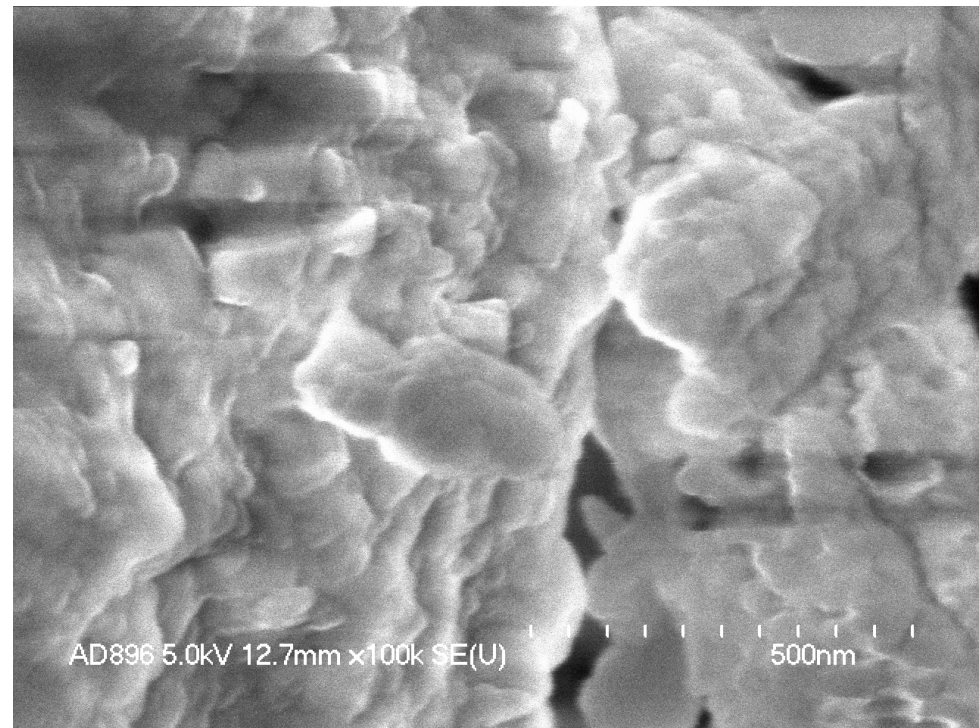
$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ 500°C – 3h



$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ 500°C – 3h



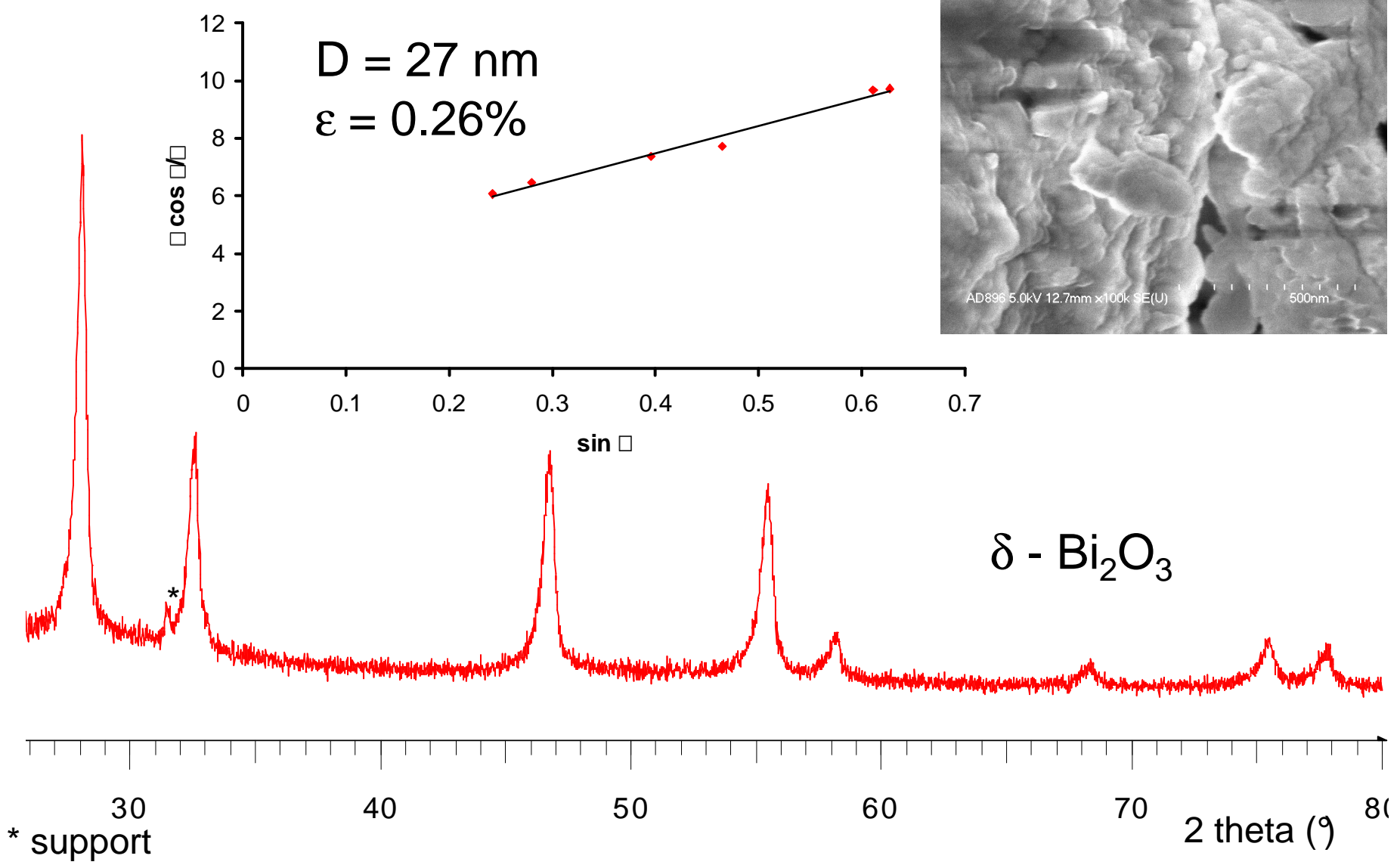
compacité : 94%



grains ~ 30 nm

Frittage Flash – SPS- $(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$

$(\text{Bi}_2\text{O}_3)_{0.75}(\text{Dy}_2\text{O}_3)_{0.25}$ 500°C – 3h



- Poudre à grain de taille nanométrique facilement obtenue par précipitation
- Le frittage Flash permet de conserver la taille nanométrique des grains
- Caractérisations électriques en cours
- Optimisation des conditions de préparation des poudres



UCCS

Un grand merci à

Claude Estournes

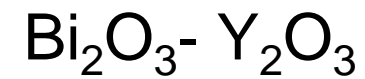
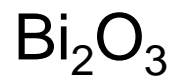
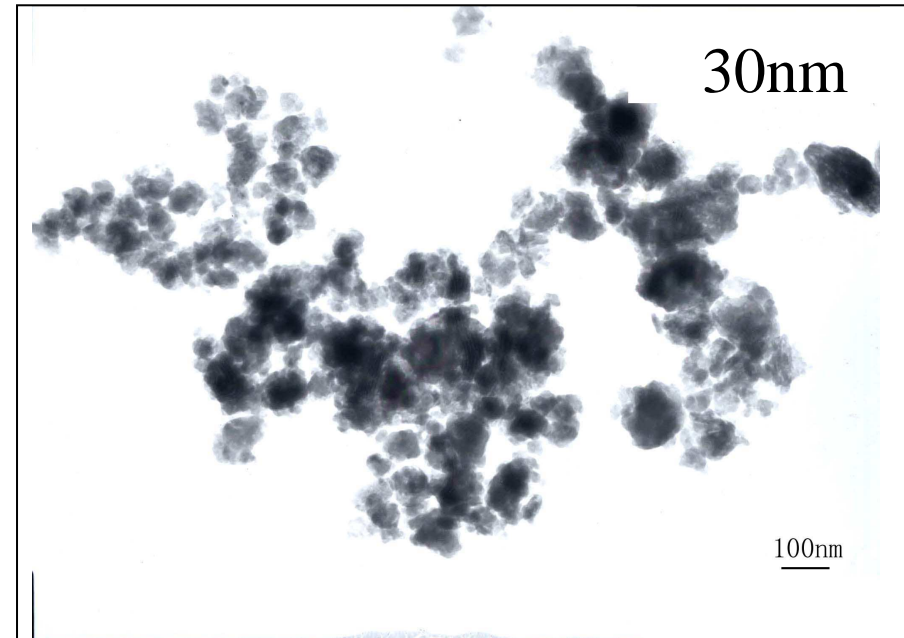
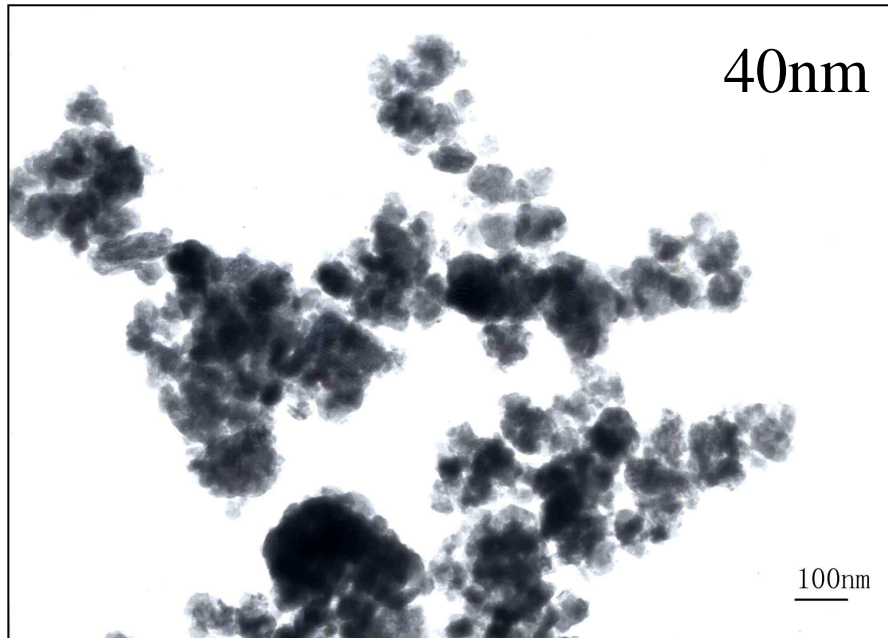
Geoffrey Chevalier



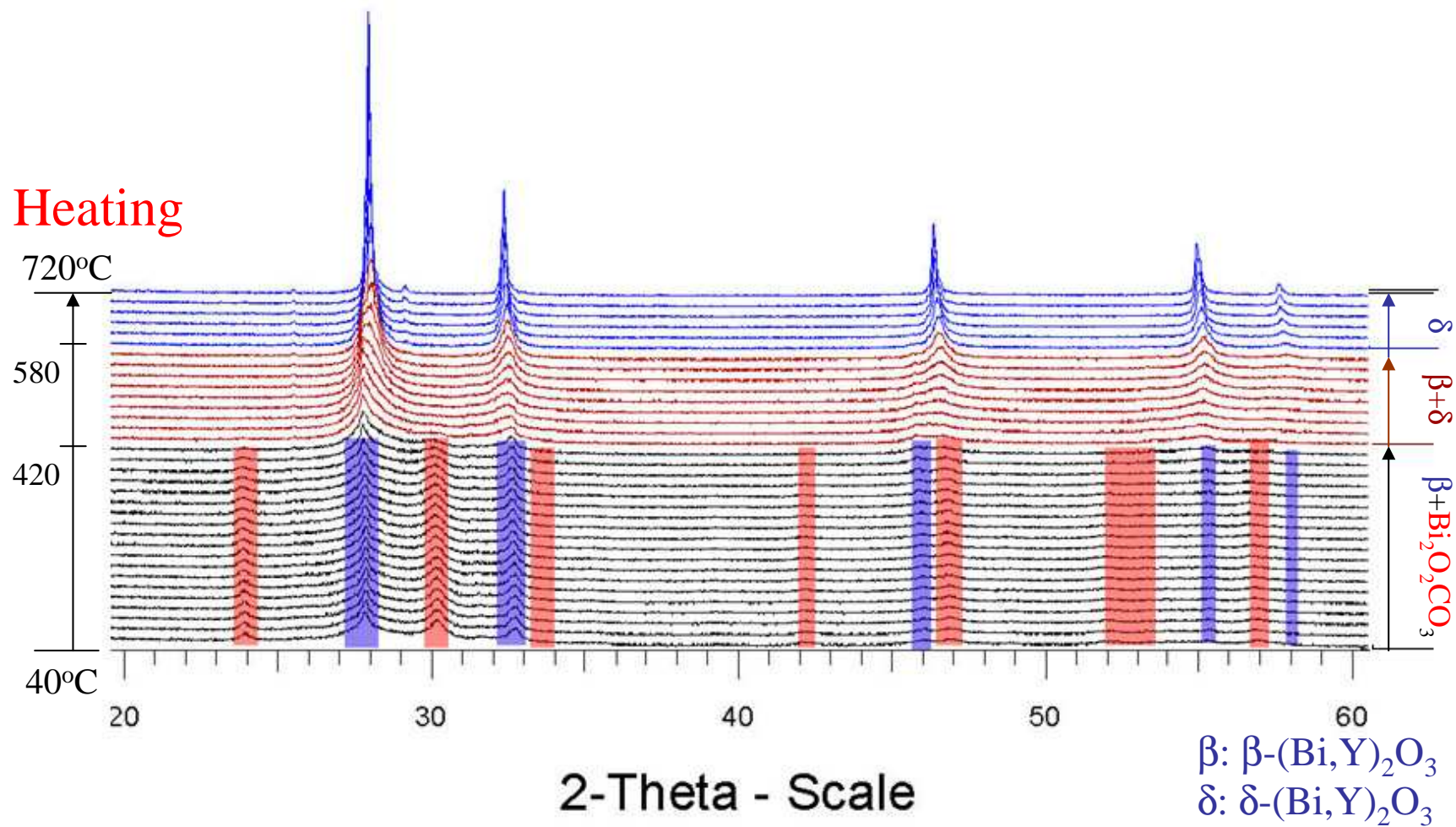
Nora Djelal (MEB)

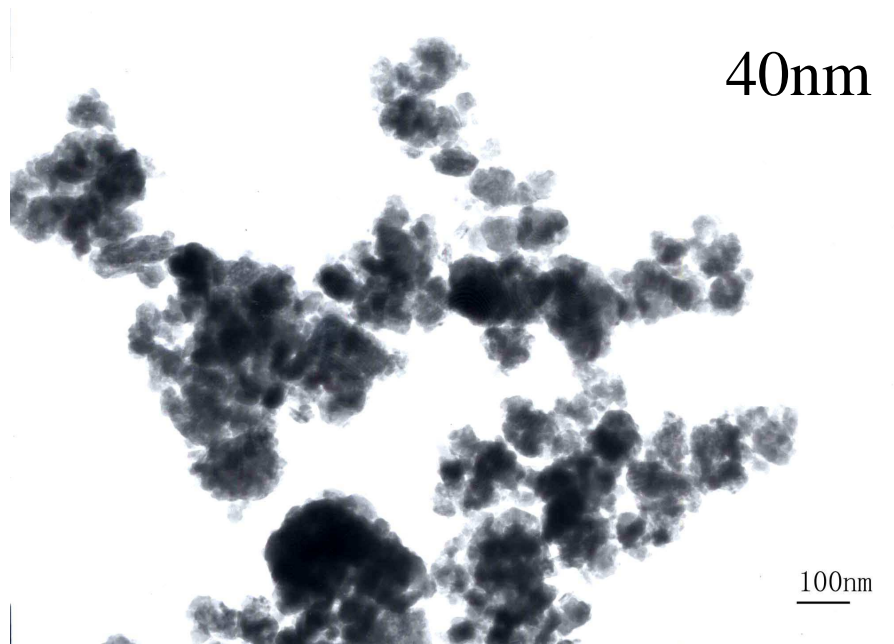
Laurence Burylo (RX)

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Poudres traitées à 360° C pendant 30 min





Bi_2O_3

Poudres traitées à 360° C pendant 30 min

Frittage Flash – SPS- Bi_2O_3

