

## INTRODUCTION

- $YFeO_3$  : Applications<sup>[1]</sup>:
  - Sensors
  - Solid oxide fuel cells
  - Magneto-optical devices
  - Catalyst (BG= 2,37eV<sup>[2]</sup>)

### • Catalyzed reaction : water splitting

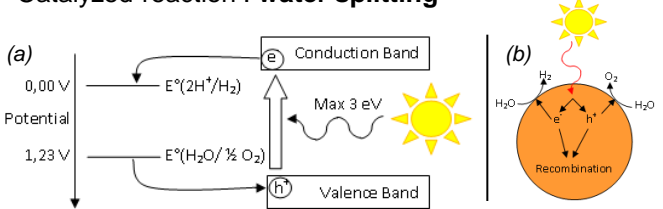


Figure 1: Principles (a) and processes (b) of water splitting using a semiconductor photocatalysts

## TECHNIQUE : Dip-Coating

- | Process                   | Parameters                |
|---------------------------|---------------------------|
| 1) Substrate immersion    | • Substrate               |
| 2) Deposition and removal | • Dipping/Removal speed   |
| 3) Drain                  | • Relative humidity       |
| 4) Solvent evaporation    | • Stabilizing temperature |
| 5) Stabilization          |                           |

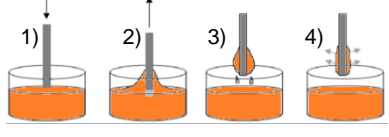


Figure 2: The different stages of the dip-coating method

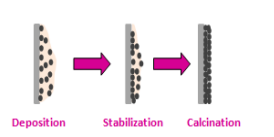


Figure 3: Particles repartition at different temperatures

## RESULTS & DISCUSSIONS

### Powders:

#### Synthesis

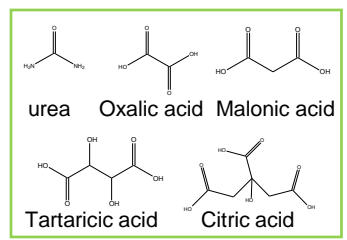
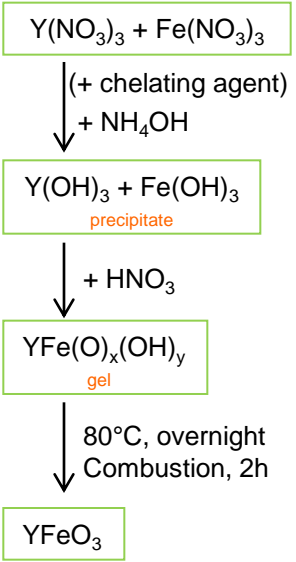


Figure 4: Chelating agent

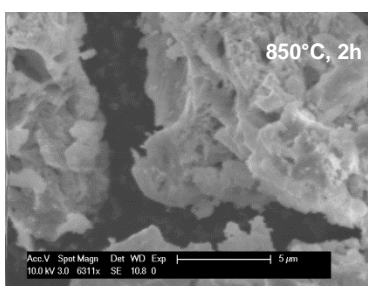
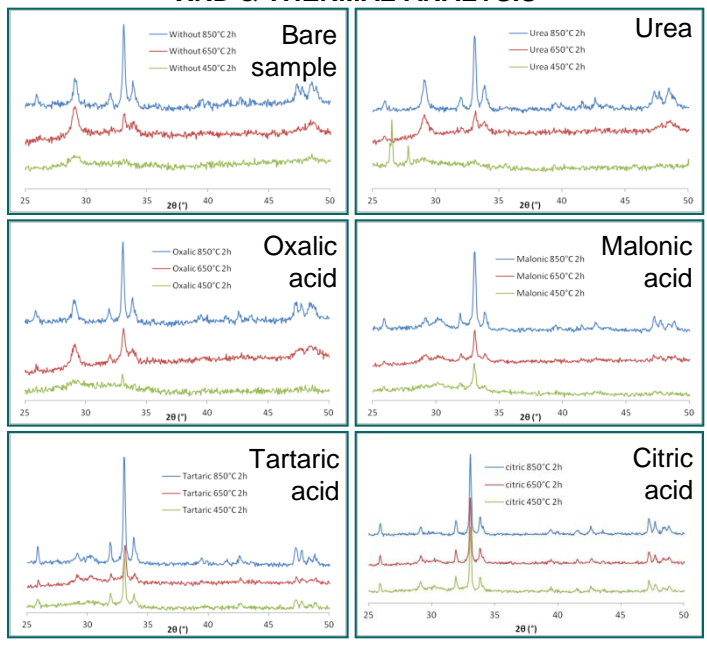


Figure 5: SEM image of  $YFeO_3$  powder calcinated at 850°C 2h

### XRD & THERMAL ANALYSIS



### Thin films

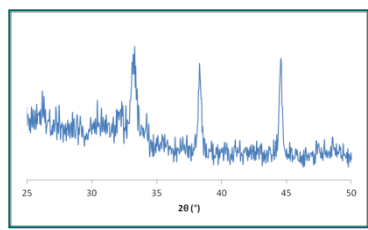
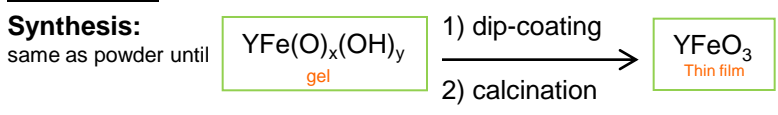


Fig 6: XRD of  $YFeO_3/Si$  calcinated at 850°C during 10h

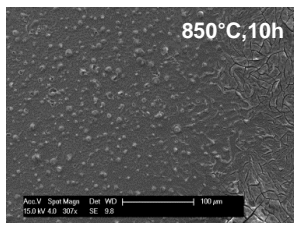


Fig 5: SEM image of calcinated  $YFeO_3/Si$

### Conclusions

- ✓ Successfully synthesize  $YFeO_3$   
→ Crystallization temperature: 850°C
- ✓ Successfully crystallize  $YFeO_3$  on monocrystalline Si
- At 850°C, TCO melts...  
→ Need to reduce the crystallization temperature
- ✓ Chelating agent are useful  
→ best one = Citric acid



[1] Rajendran, M., Ghanashyam Krishna, M., Bhattacharya, A.K., Low temperature preparation of orthoferrite thin-films by an inorganic sol-gel process. *Thin Solid Films* 2001, 385, 230-233.  
 [2] Tang, Peisong; Sun, He; Chen, Haifeng; Cao, Feng, Hydrothermal Processing-Assisted Synthesis of Nanocrystalline  $YFeO_3$  and its Visible-Light Photocatalytic Activity, *Current Nanoscience*, Vol 8, Num 1, Feb 2012, pp. 64-67(4)