INTRODUCTION

- **YFeO$_3$**: Applications:
  - Sensors
  - Solid oxide fuel cells
  - Catalyst (BG= 2,37eV)

- Catalyzed reaction: water splitting

![Figure 1](image1.png): Principles (a) and processes (b) of water splitting using a semiconductor photocatalysts

**TECHNIQUE**: Dip-Coating

**Process**
1) Substrate immersion
2) Deposition and removal
3) Drain
4) Solvent evaporation
5) Stabilization

**Parameters**
- Substrate
- Dipping/Removal speed
- Relative humidity
- Stabilizing temperature

![Figure 2](image2.png): The different stages of the dip-coating method

**XRD & THERMAL ANALYSIS**

![Figure 4](image3.png): Chelating agent

**RESULTS & DISCUSSIONS**

**Powders:**

**Synthesis**

\[
\begin{align*}
Y(NO_3)_3 + Fe(NO_3)_3 & \xrightarrow{(+ \text{ chelating agent})} Y(\text{OH})_3 + Fe(\text{OH})_3 \\
Y(\text{OH})_3 + Fe(\text{OH})_3 & \xrightarrow{+ \text{ HNO}_3} YFe(O)_{x}\text{(OH)}_{y} \text{gel} \\
YFeO_3 & \xrightarrow{80^\circ \text{C, overnight}} \text{Combustion, 2h} \\
\end{align*}
\]

**Thin films**

**Synthesis:** same as powder until

\[
YFeO_3 \xrightarrow{1) \text{ dip-coating}} YFeO_3 \xrightarrow{2) \text{ calcination}} \text{Thin film}
\]

**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

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