

# Work report 140220: Co-sputtered ZnO-SnO<sub>2</sub>

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## 1 Overview

Deposition and optical characterisation of co-sputtered Zn-Sn-O films on OptiWhite and Si substrates. Samples sent to Robert Palgrave, UCL. Film profiles determined using ellipsometry - interpolated from 81pt measurement grid over  $8 \times 8 \text{ cm}^2$  central area. Identical samples sent to Cranfield University (XRD mapping) and Binghampton, NY (HAXAS, UPS)

## 2 Film recipe

- Material: ZnO:SnO<sub>2</sub> (co-sputtered)
- Power (W): 250:80
- Pressure (mTorr): 5 (Ar)
- Growth Time: 60 min
- Rotation: OFF

## 3 Film profiles

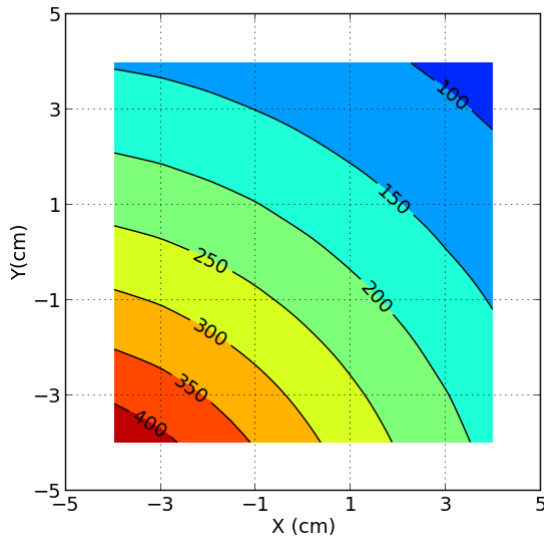


Figure 1: ZnO calibration sample. Contours show film thickness (in nm).

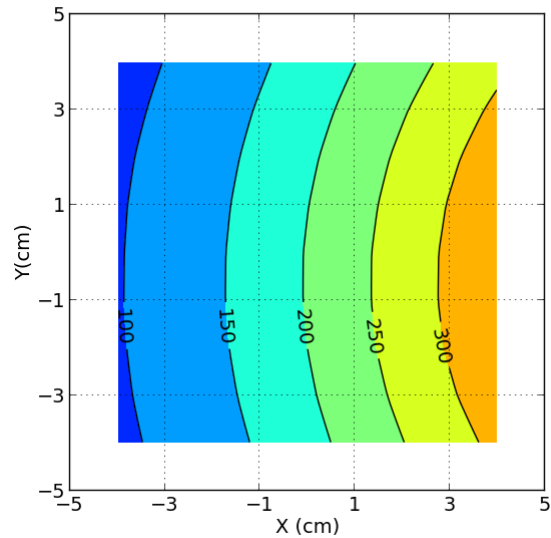


Figure 2: SnO<sub>2</sub> calibration sample. Contours show film thickness (in nm).

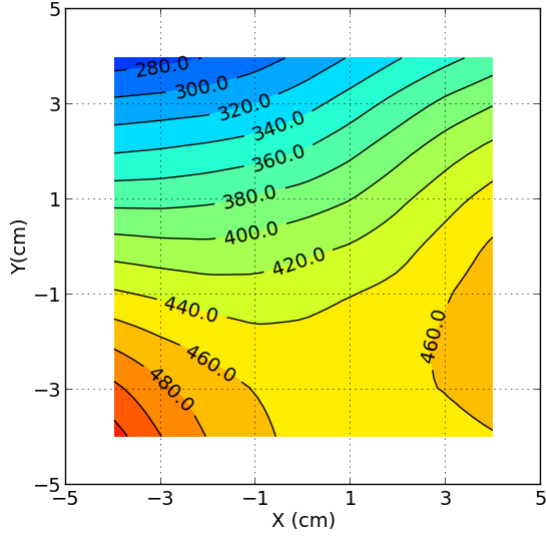


Figure 3: Calculated thickness of co-sputtered ZnO:SnO<sub>2</sub> film. Contours show film thickness (in nm).

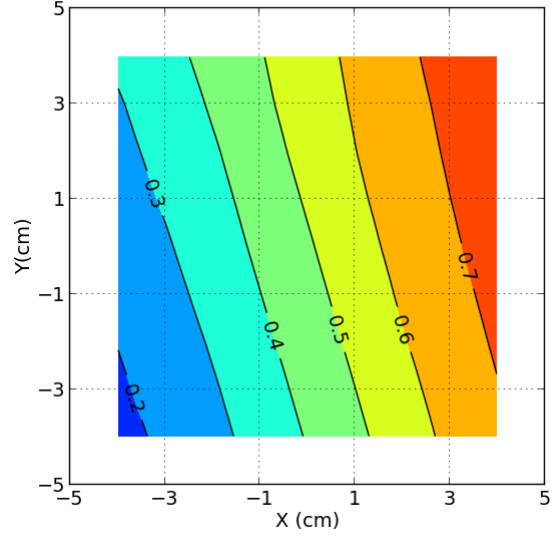


Figure 4: Profile of ratio  $d_{\text{SnO}_2} / (d_{\text{ZnO}} + d_{\text{SnO}_2})$  calculated using figures 1 and 2.

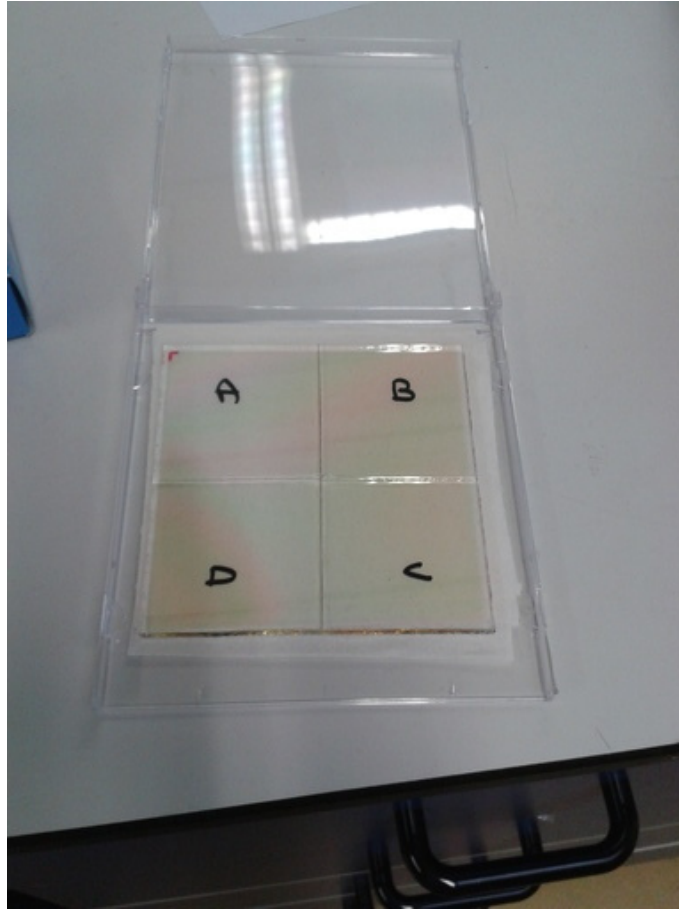


Figure 5: Sample 140220\_2. Cut into 4  $5 \times 5$  cm<sup>2</sup> pieces. Orientation of sample in this photo corresponds directly with profile shown in figure 4. Note: Film side is face-up in this photo.

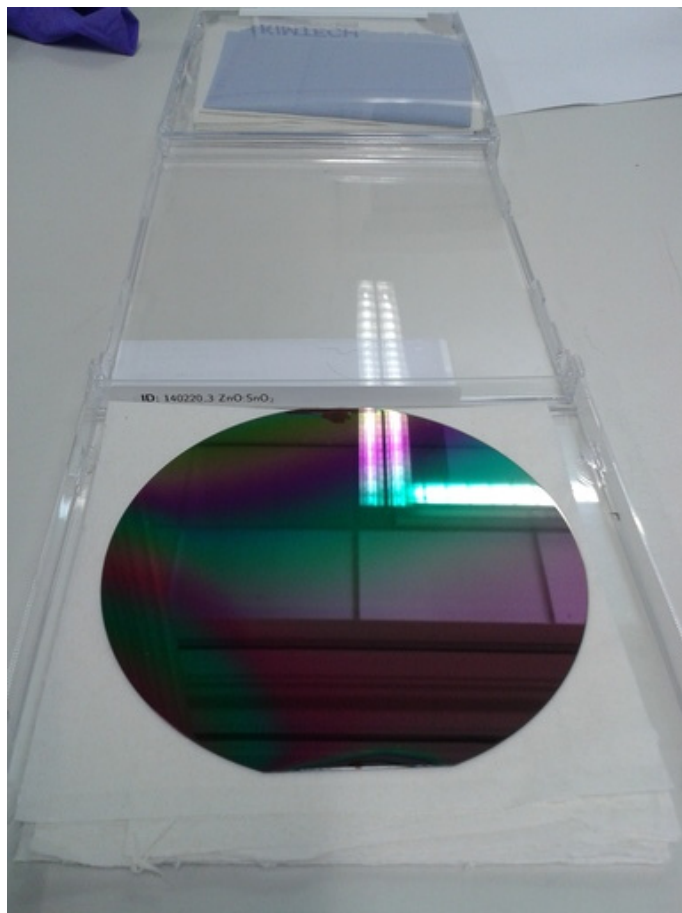


Figure 6: Sample 140220\_3. Orientation of sample in this photo corresponds directly with the profile shown in figure 4