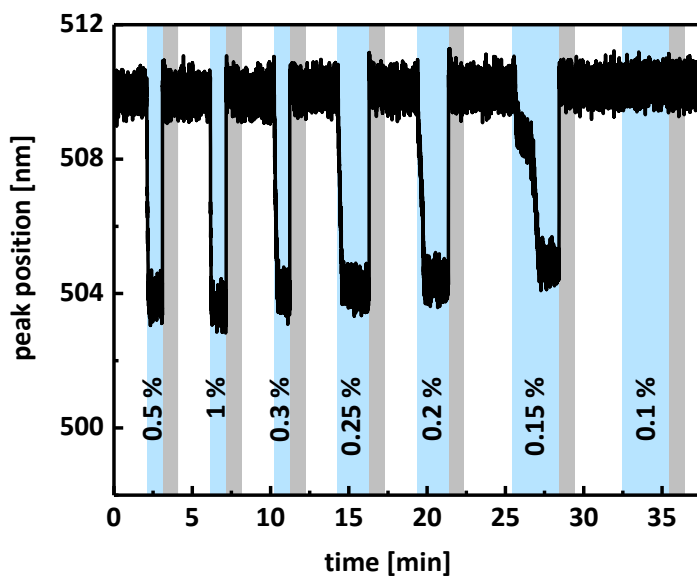
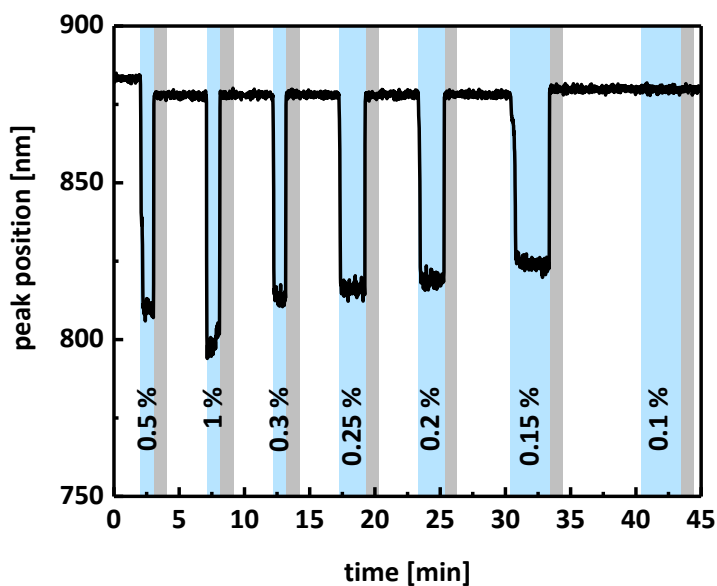


## Supporting Information



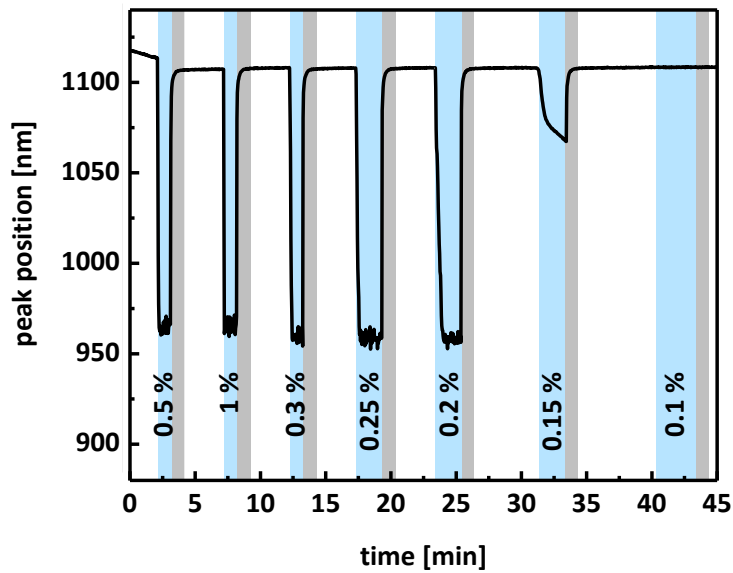
**Figure S1.** Reflection peak position shift of a  $\text{WO}_3$  inverse opal (pore size: 277 nm) during  $\text{H}_2$  sensing measurement at  $140^\circ\text{C}$ .

(blue region:  $\text{H}_2$  exposure; grey region: regeneration by synthetic air; white region: flushed by pure  $\text{N}_2$ )



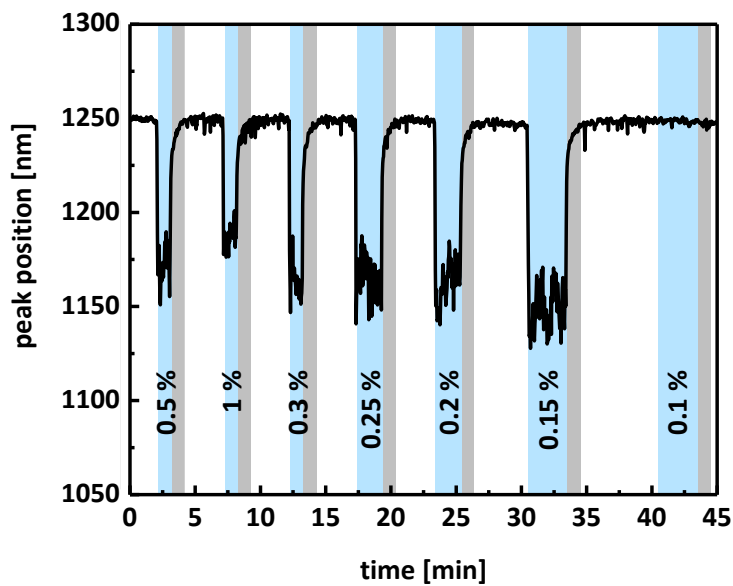
**Figure S2.** Reflection peak position shift of a  $\text{WO}_3$  inverse opal (pore size: 452 nm) during  $\text{H}_2$  sensing measurement at  $140^\circ\text{C}$ .

(blue region:  $\text{H}_2$  exposure; grey region: regeneration by synthetic air; white region: flushed by pure  $\text{N}_2$ )



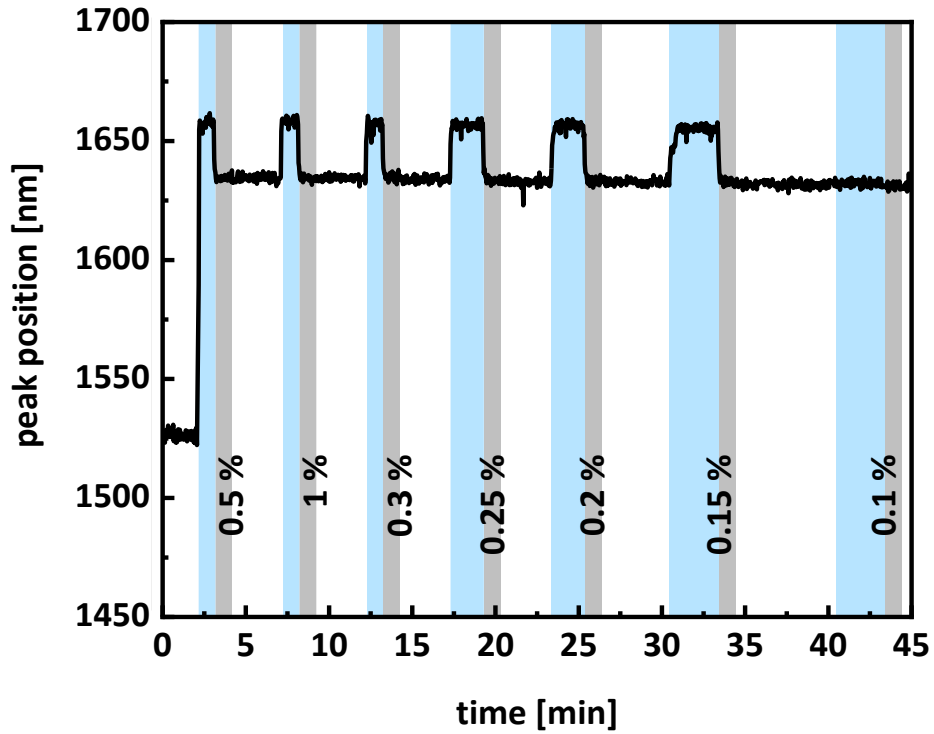
**Figure S3.** Reflection peak position shift of a  $\text{WO}_3$  inverse opal (pore size: 553 nm) during  $\text{H}_2$  sensing measurement at 140 °C.

(blue region:  $\text{H}_2$  exposure; grey region: regeneration by synthetic air; white region: flushed by pure  $\text{N}_2$ )

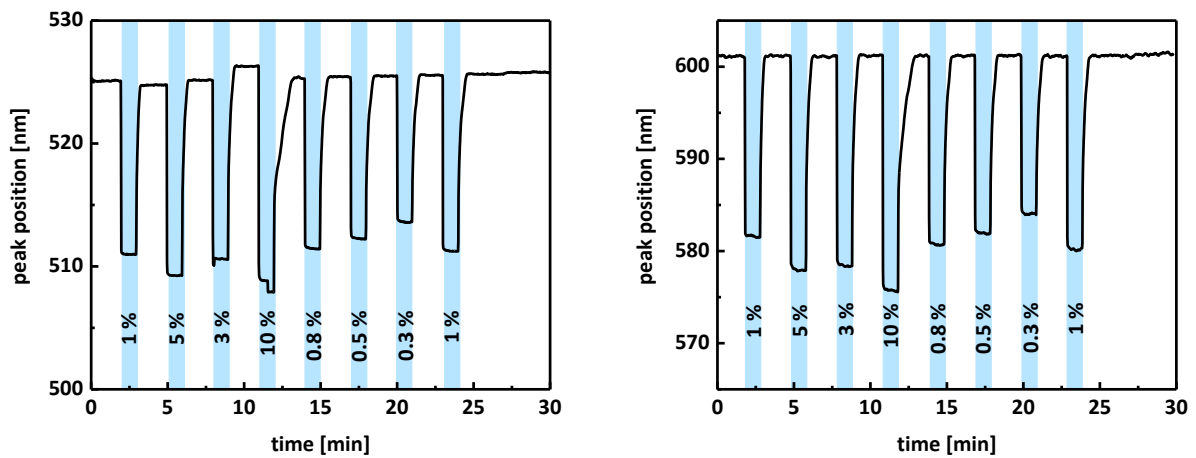


**Figure S4.** Reflection peak position shift of a  $\text{WO}_3$  inverse opal (pore size: 583 nm) during  $\text{H}_2$  sensing measurement at 140 °C.

(blue region:  $\text{H}_2$  exposure; grey region: regeneration by synthetic air; white region: flushed by pure  $\text{N}_2$ )



**Figure S5.** Reflection peak position shift of a  $\text{WO}_3$  inverse opal (pore size: 619 nm) during  $\text{H}_2$  sensing measurement at 140 °C. (blue region:  $\text{H}_2$  exposure; grey region: regeneration by synthetic air; white region: flushed by pure  $\text{N}_2$ )



**Figure S6.** Reflection peak position shift of  $\text{WO}_3$  inverse opal with different band gap position (left: 525 nm, right: 601 nm) during  $\text{H}_2$  sensing measurement in an open system at 200 °C (blue region:  $\text{H}_2$  exposure; white region: flushed by pure  $\text{N}_2$ )