Supporting Information

Humidity-Independent Oxide Semiconductor Chemiresistors Using Terbium-Doped SnO_2 Yolk-Shell Spheres for Real-Time Breath Analysis

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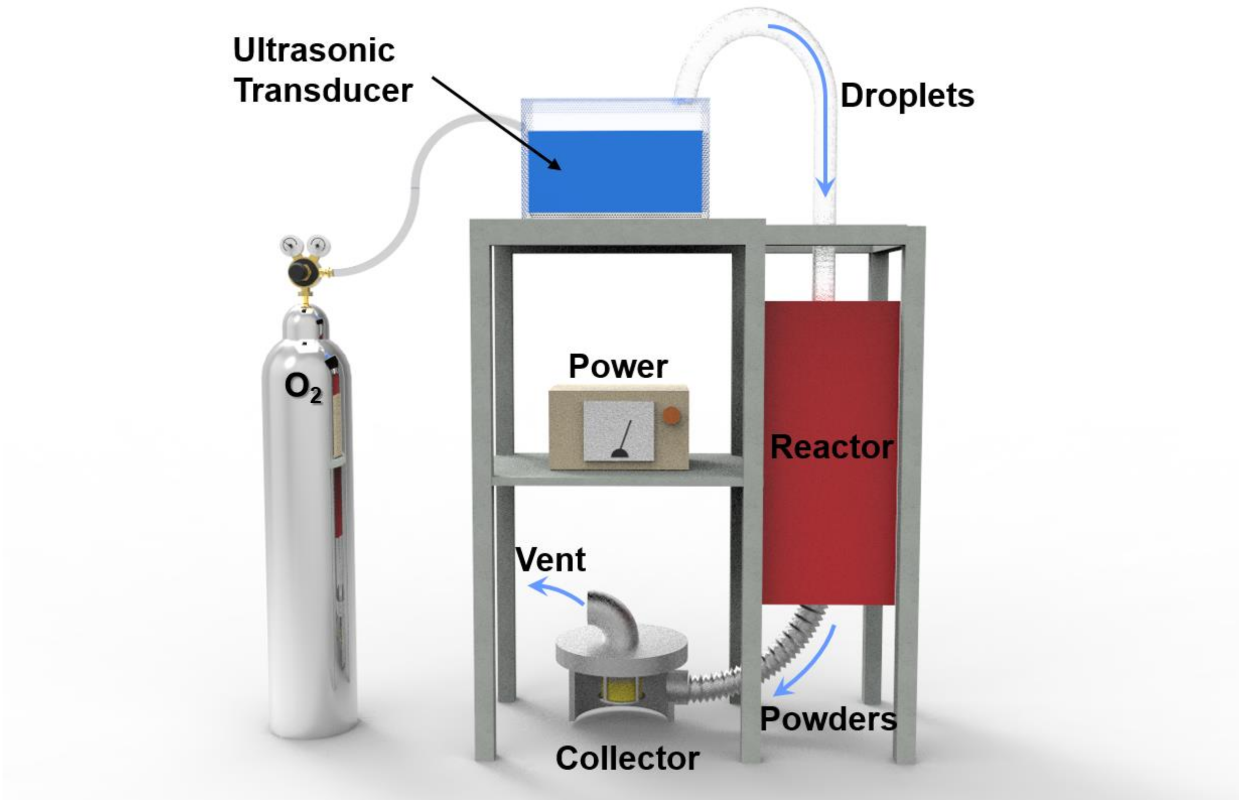

Figure S1. Schematic of the ultrasonic spray pyrolysis process for synthesizing yolk-shell spheres.

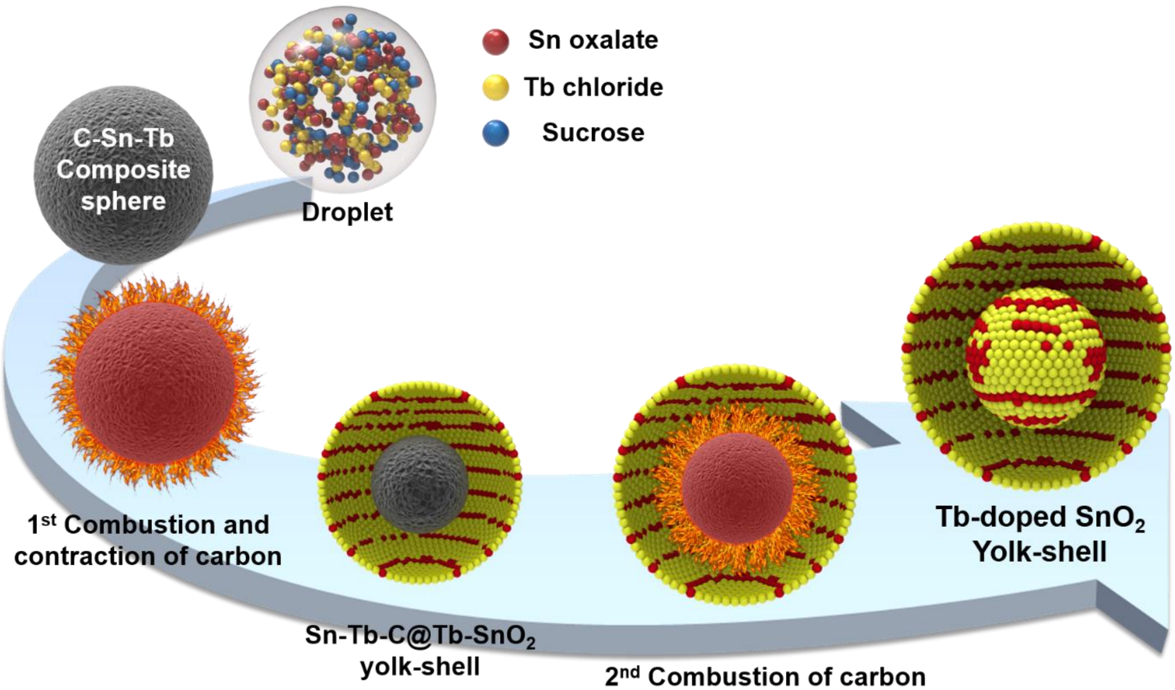

Figure S2. Formation mechanism of Tb-doped SnO_2 yolk-shells via spray pyrolysis.

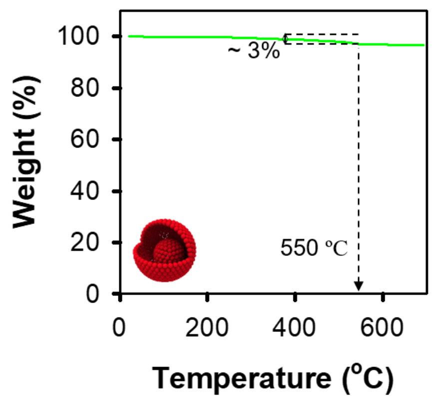

Figure S3. TG curve of as-prepared precursors of 5Tb-SnO_2 spheres**.**

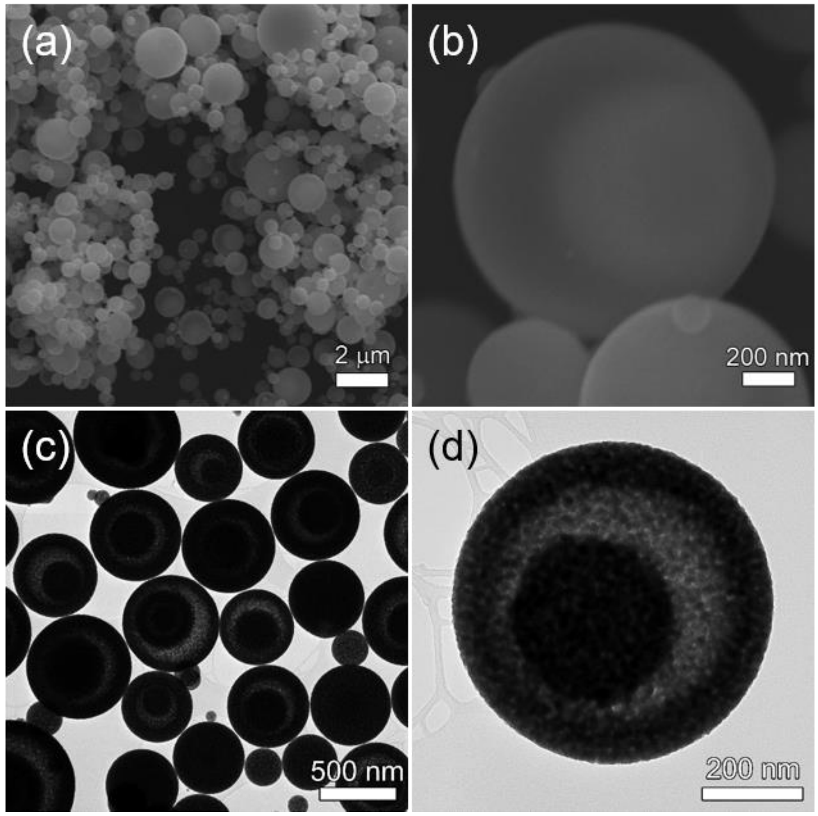

Figure S4. (a,b) SEM and (c,d) TEM images in pure SnO_2 yolk-shell spheres.

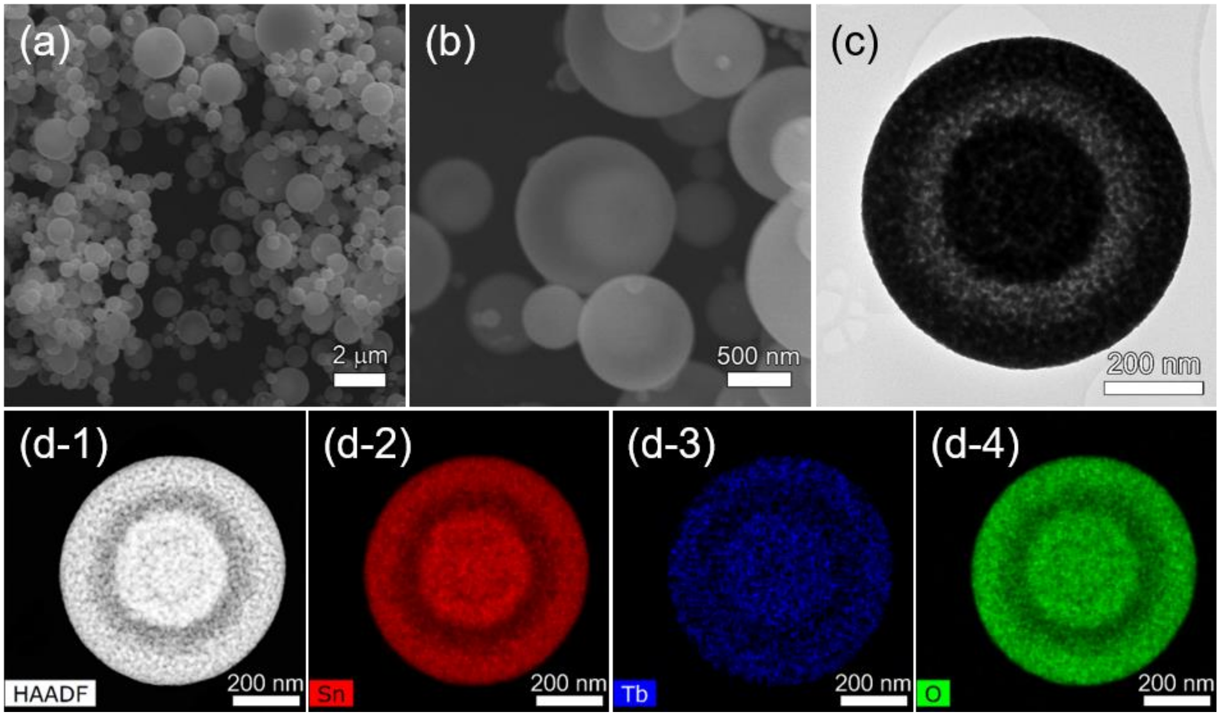

Figure S5. (a-c) SEM images and TEM images of 1Tb-SnO_2 yolk-shell spheres; (d) EDS elemental mapping of Sn, Tb, and O in 1Tb-SnO_2 yolk-shell spheres.

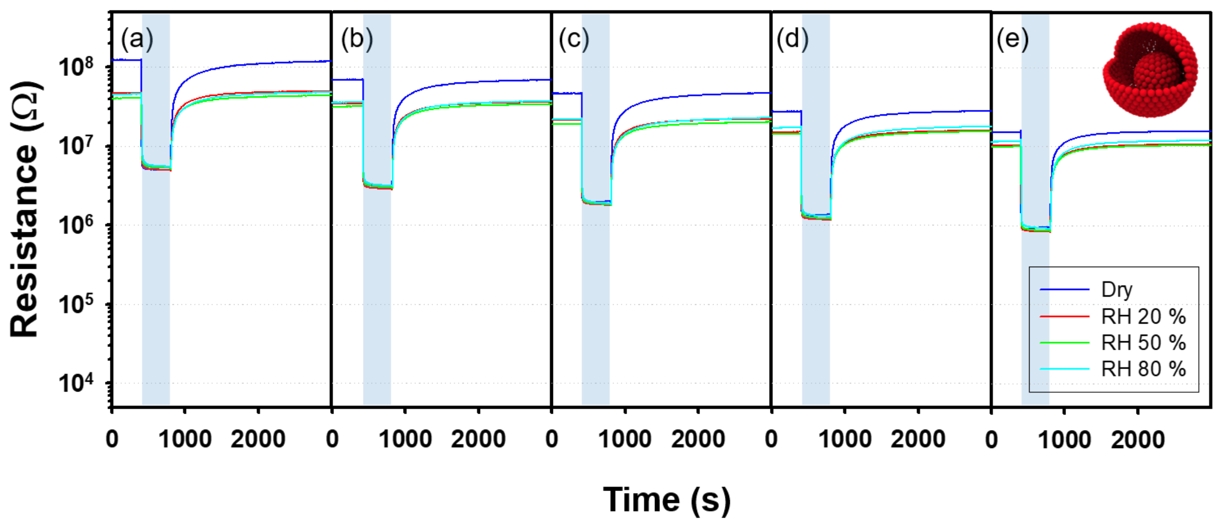

Figure S6. Gas-sensing transients of the 5Tb-SnO_2 sensor to 20 ppm of acetone at (a) 350 °C, (b) 375 °C, (c) 400 °C, (d) 425 °C and (e) 450 °C in dry and humid conditions (RH = 20, 50, 80%).

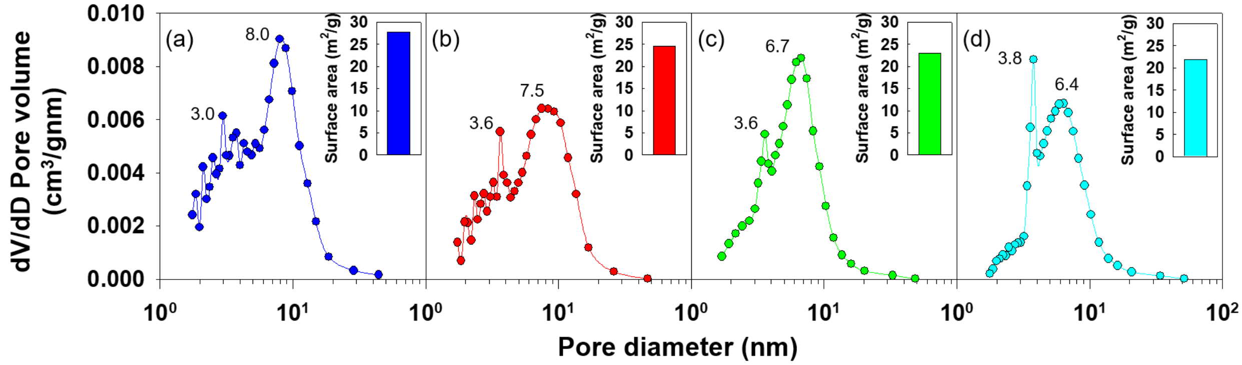

Figure S7. Pore-size distributions and BET specific surface areas of (a) pure SnO_2, (b) 1Tb-SnO_2, (c) 5Tb-SnO_2, and (d) 15Tb-SnO_2 yolk-shell spheres measured by N_2 desorption isotherm.

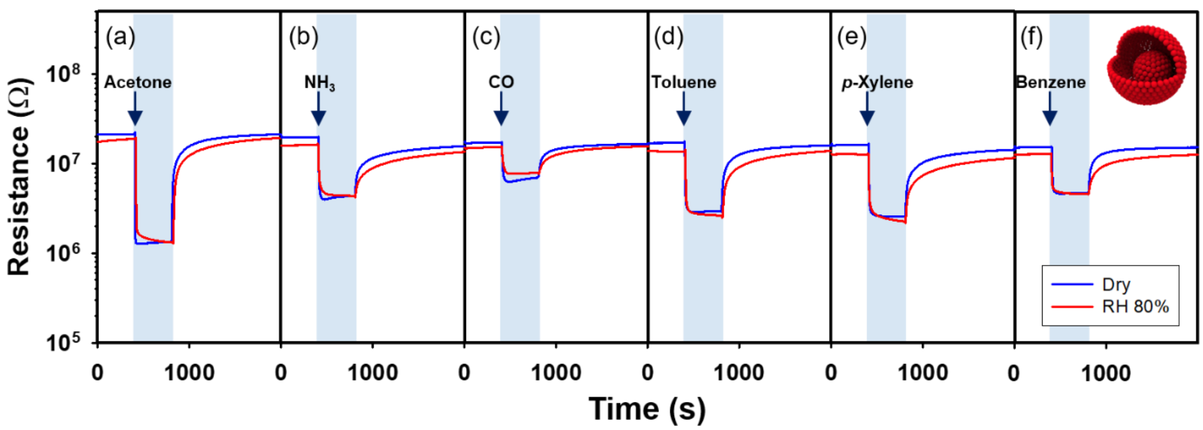

Figure S8. Gas-sensing transients of the 5Tb-SnO_2 sensor to 20 ppm of (a) acetone, (b) NH_3, (c) CO, (d) toluene, (e) *p*-xylene, and (f) benzene at 450 °C in dry and humid conditions (RH = 80%).

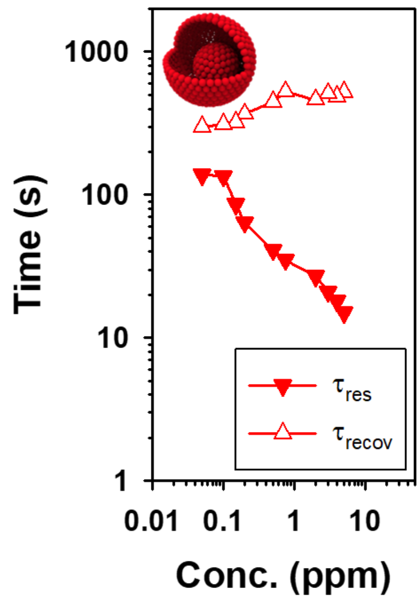

Figure S9. Response and recovery times of 5Tb-SnO_2 sensor upon exposures to acetone and air as a function of acetone concentration at 450 °C in humid condition (RH = 80%).