## **Supporting Information (SI)**

## Comparative study on formic acid sensing of flame-made Zn<sub>2</sub>SnO<sub>4</sub> nanoparticles and its parent metal oxides

Matawee Punginsang<sup>a</sup>, Kanittha Inyawilert<sup>a</sup>, Mameaseng Siriwalai<sup>b,c,e</sup>,

Anurat Wisitsoraat<sup>d</sup>, Adisorn Tuantranont<sup>d</sup>, Chaikarn Liewhiran<sup>a,e,\*</sup>

<sup>a</sup> Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

<sup>b</sup> Ph.D. Program in Nanoscience and Nanotechnology (International

Program/Interdisciplinary), Faculty of Science, Chiang Mai University, Chiang Mai, 50200,

Thailand

<sup>c</sup> Graduate School, Chiang Mai University, Chiang Mai, 50200, Thailand

<sup>d</sup> National Security and Dual-Use Technology Center, National Science and Technology

Development Agency (NSTDA), Klong Luang, Phathum Thani 12120, Thailand

<sup>e</sup> Center of Excellence in Materials Science and Technology, Chiang Mai University, Chiang

Mai 50200, Thailand

Tel+:.66-81-408-2324; Fax+:66-53-892-271

\*Corresponding author's e-mail address: cliewhiran@gmail.com

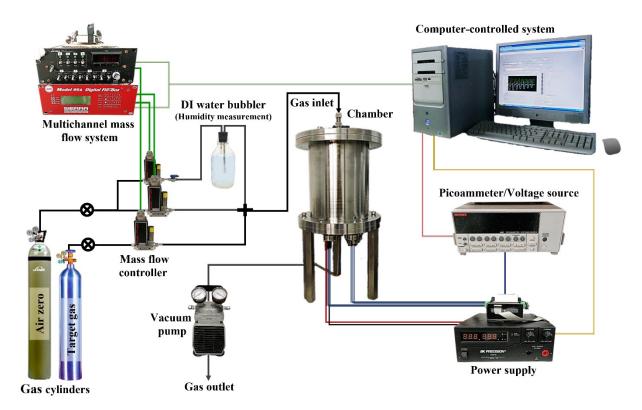


Fig. S1. Schematic diagram of gas sensor testing system.

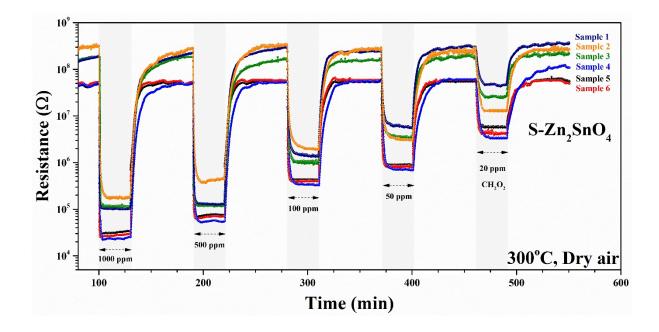
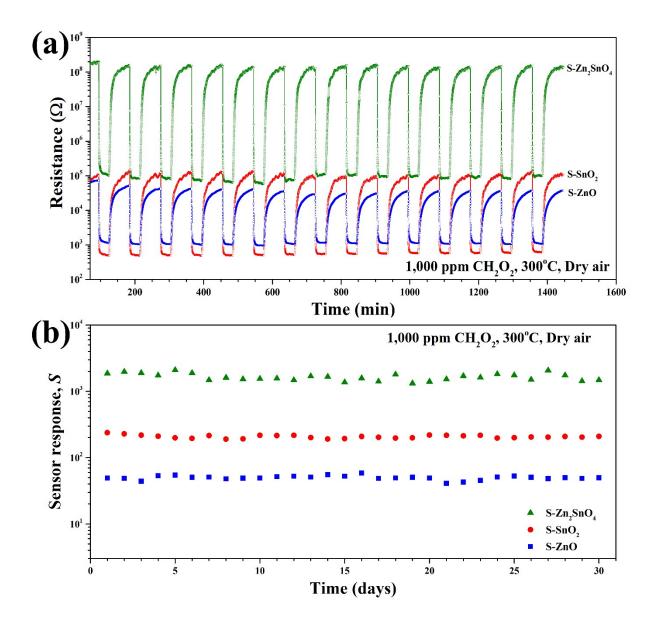


Fig. S2. the changes in resistance of six  $S-Zn_2SnO_4$  sensors fabricated in the same batch towards 20–1,000 ppm CH<sub>2</sub>O<sub>2</sub> at 300°C.



**Fig. S3.** (a) changes in resistance of  $S-Zn_2SnO_4$ ,  $S-SnO_2$ , and S-ZnO sensors towards fifteen consecutive pulses of 1,000 ppm formic acid ( $CH_2O_2$ ) and (b) the corresponding sensor response under exposure 1,000 ppm  $CH_2O_2$  for consecutive 30 days at 300°C.