



**Fig. S1** The SEM image of Cu/carbon layers synthesized by thermolysis of pure copper citrate under a continuous argon/hydrogen gas (9:1/v:v) at 700 °C with a heating rate of 4 °C min<sup>-1</sup> and held at this temperature for 2 h.

The TGA result is accordance with the EDX result according to the following formula:

The increased weight ratio of composite after annealing in air

$$= (\text{Cu \%} \cdot 16 + \text{Sb \%} \cdot 16 \cdot 3/2 - \text{C \%} \cdot 12) / (\text{Cu \%} \cdot 64 + \text{Sb \%} \cdot 121 + \text{C \%} \cdot 12)$$

$$= 20.22 \%$$