

Supporting Information

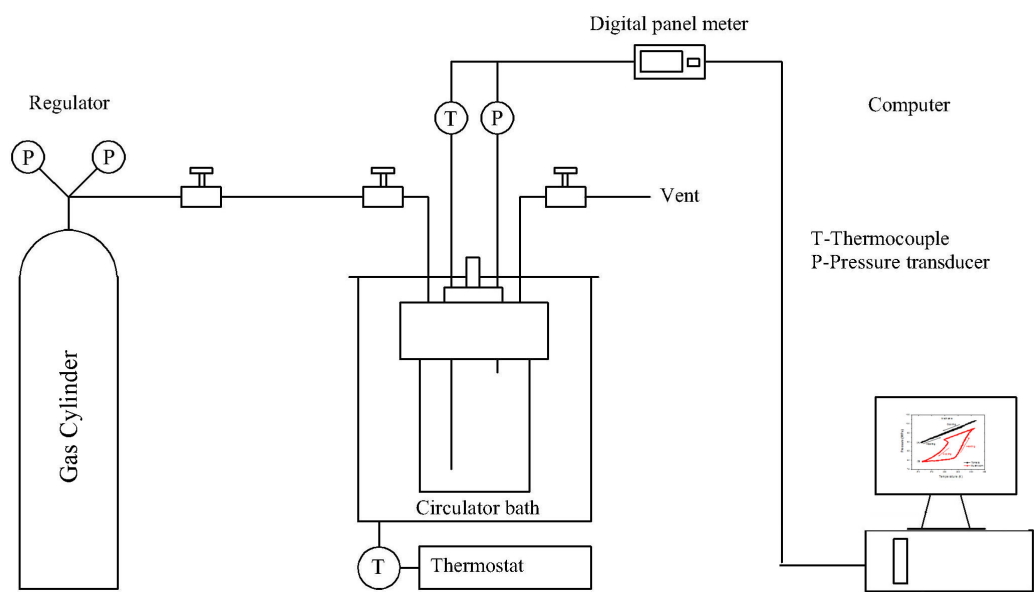


Figure S1. Schematic diagram of the experimental apparatus.

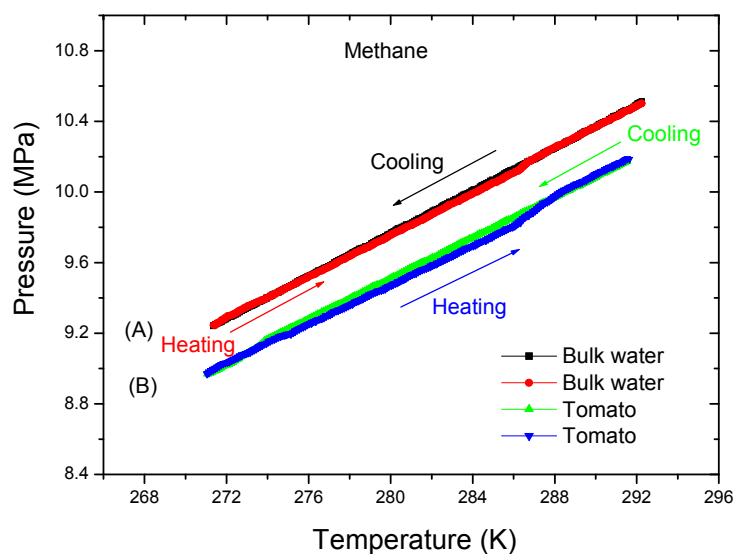


Figure S2. Pressure-temperature plots for CH₄ uptake in bulk water (A) and tomato sample (B) during cooling and heating (temperature ramp: 4 K/h). Neither bulk water nor the tomato sample absorbs appreciable quantities of gas in the absence of mixing under these conditions.

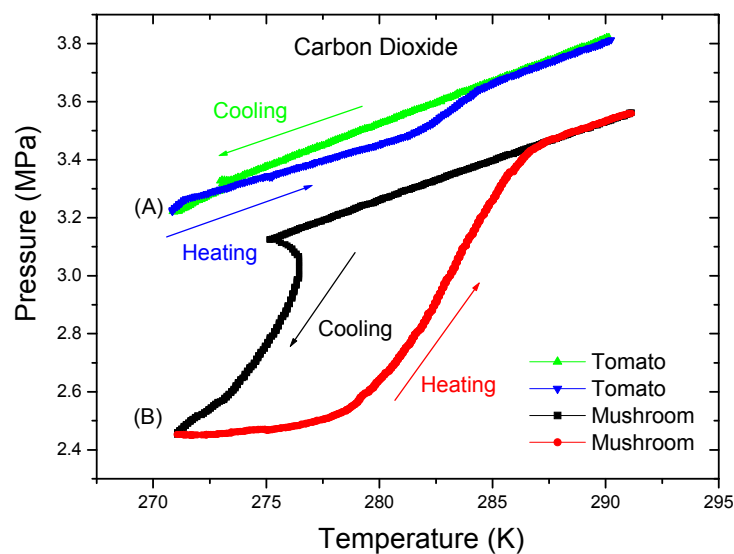


Figure S3. Pressure-temperature (P, T) plot for CO_2 in tomato sample (A) and mushroom sample (B) during cooling and heating (temperature ramp: 4 K/h). The mushroom sample absorbs significant quantities of CO_2 while the tomato does not.

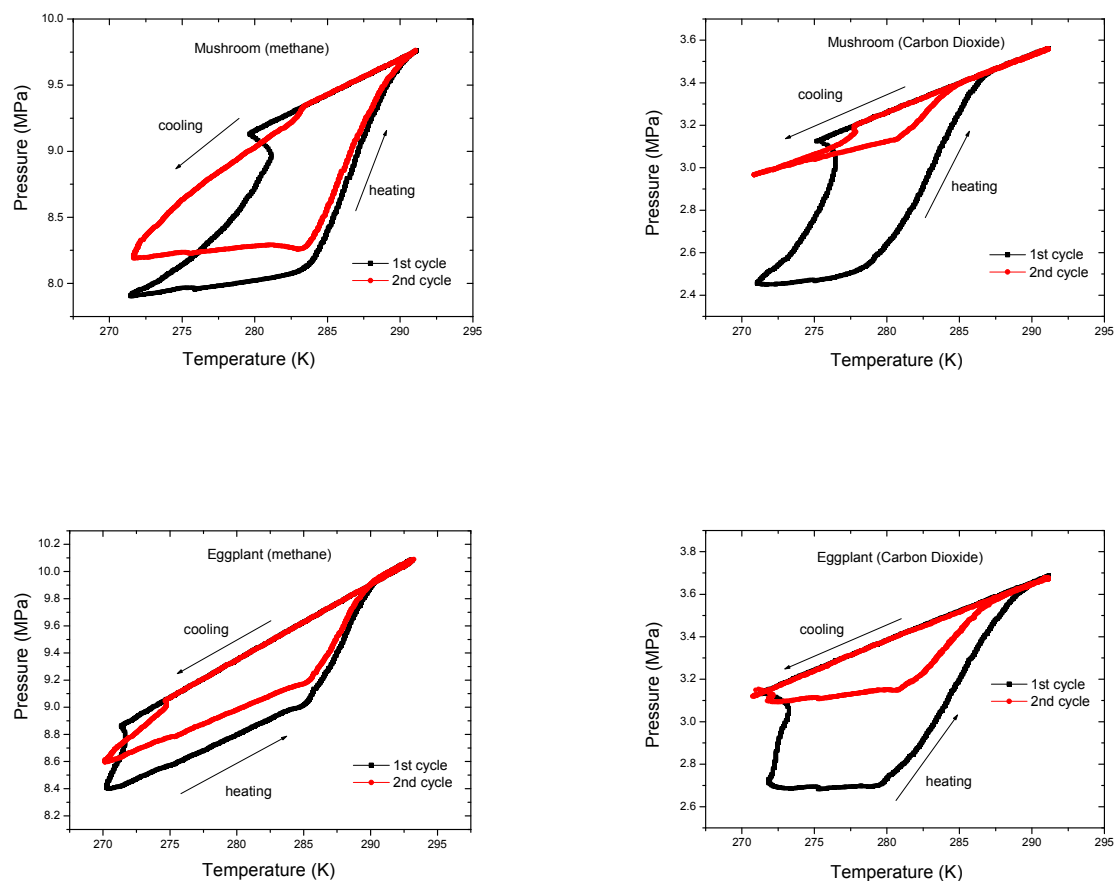


Figure S4. Recyclability tests for mushroom and eggplant samples during cooling & heating in the presence of methane or carbon dioxide (temperature ramp: 4.0 K/h). The experiments show performance degradation after one cycle, especially in the case of CO₂.

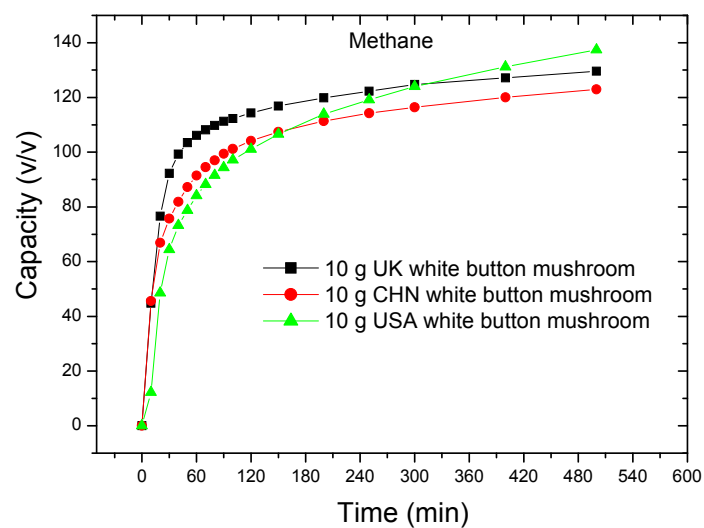
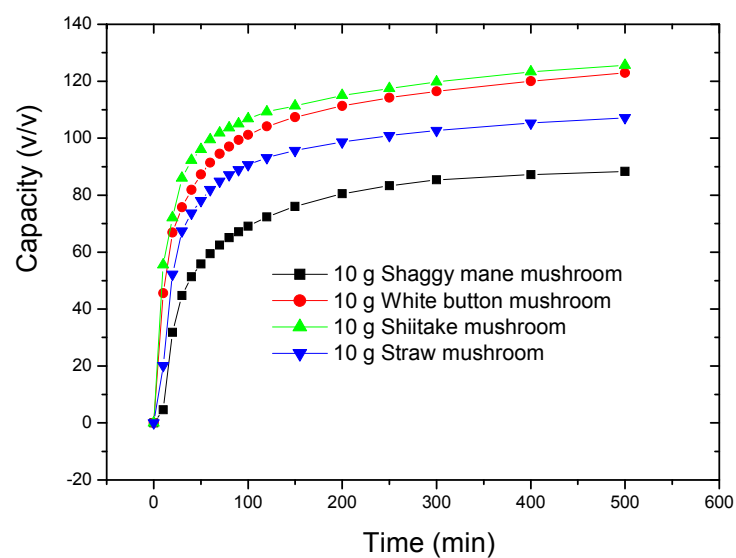


Figure S5. Methane uptake kinetics in white button mushrooms [*Agaricus bisporus*] purchased in China, UK and USA at 273.2 K (initial pressure: 8.7 MPa).



5 **Figure S6.** Methane uptake kinetics in 4 different species of Chinese mushrooms at 273.2 K (initial pressure: 8.7 MPa).

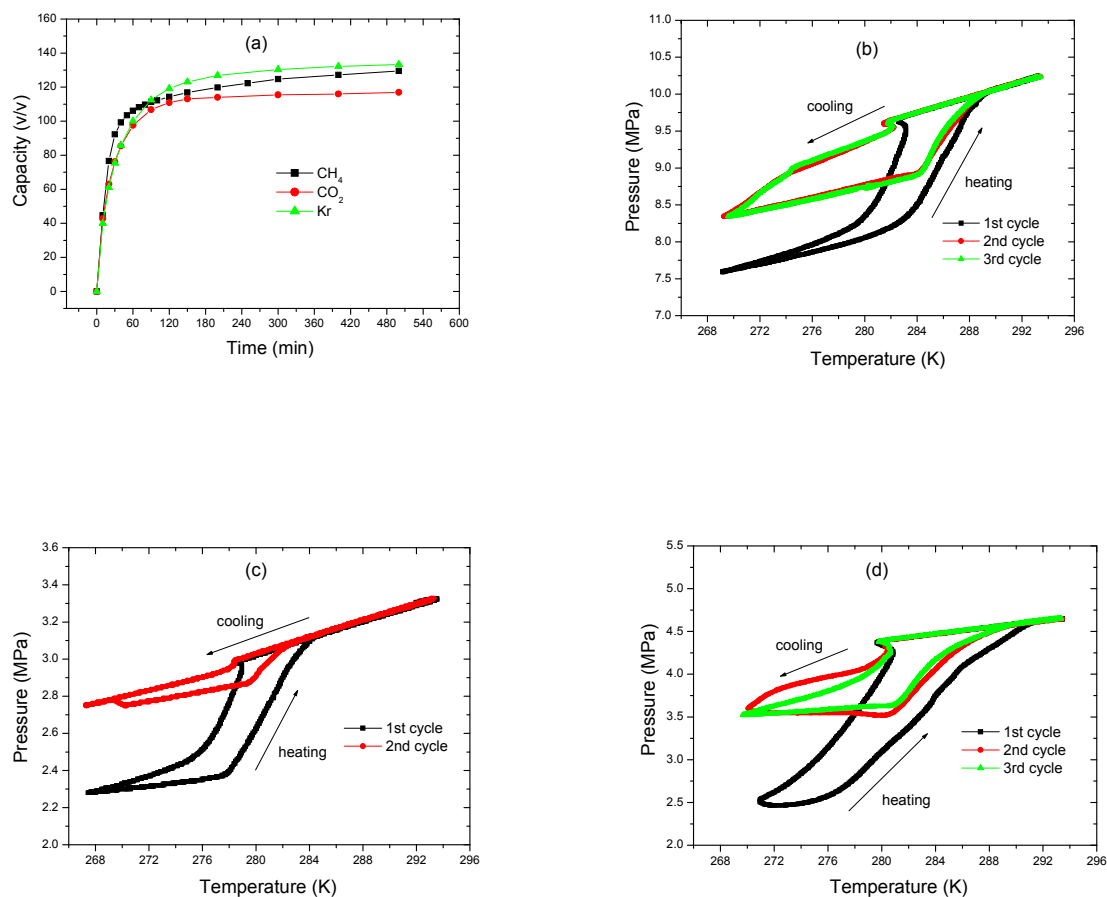


Figure S7. (a) Gases uptake kinetics in white button mushroom sample (*Agaricus bisporus*; Tesco, Liverpool, UK) at 273.2 K for three different gases, methane, carbon dioxide, and krypton (first cycle); (b) *P-T* plot for CH₄ and mushroom sample during cooling and heating (temperature ramp: 2 K/h); (c) *P-T* plot for CO₂ and mushroom sample during cooling and heating (temperature ramp: 2.5 K/h); (d) *P-T* plot for Kr and mushroom sample during cooling and heating (temperature ramp: 4 K/h).

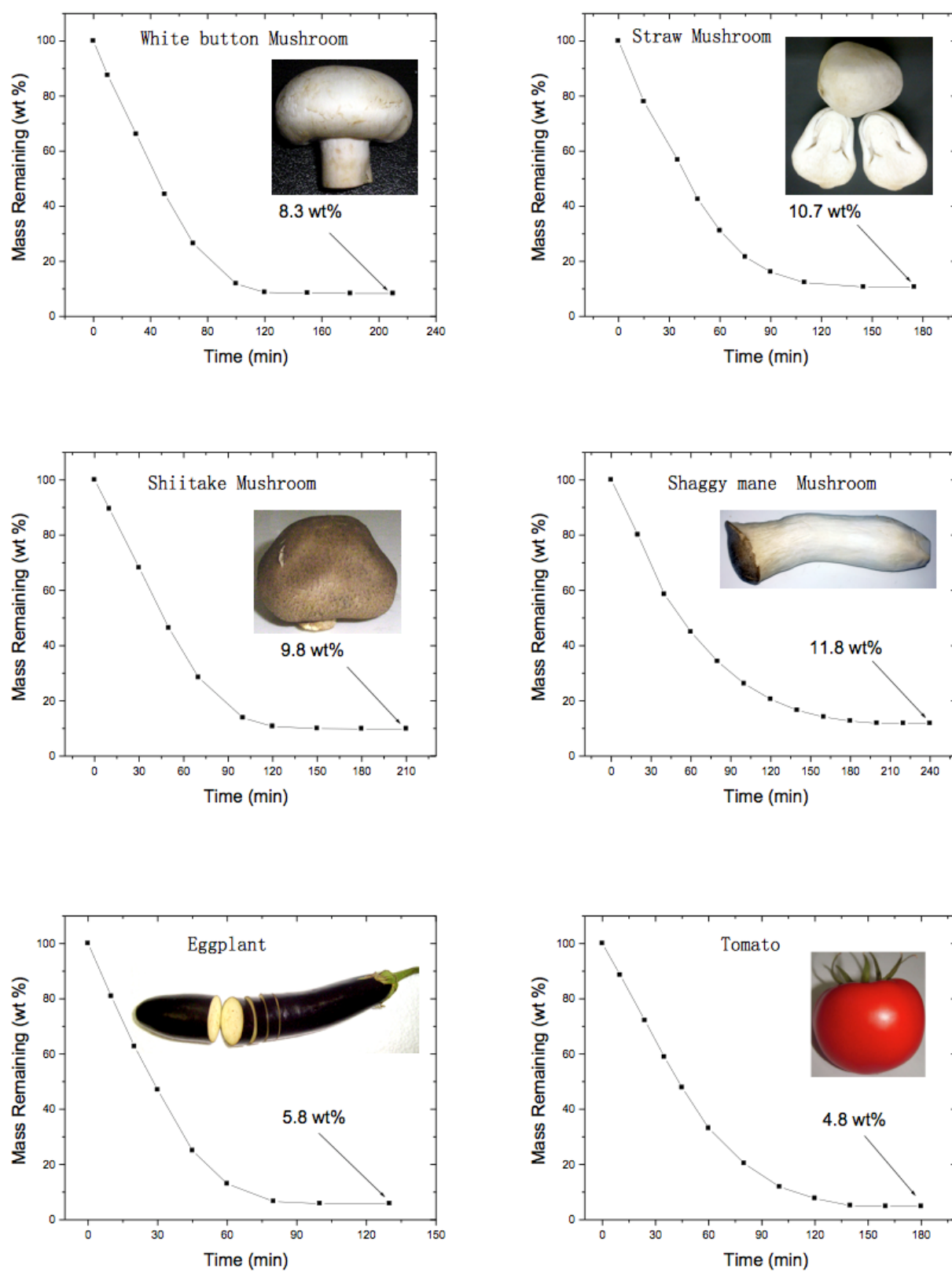


Figure S8. Weight loss curves of mushroom, eggplant and tomatoes as recorded in an oven at 378 K. We ascribe most of the mass loss to water, although other volatile species may also be lost at these temperatures.

