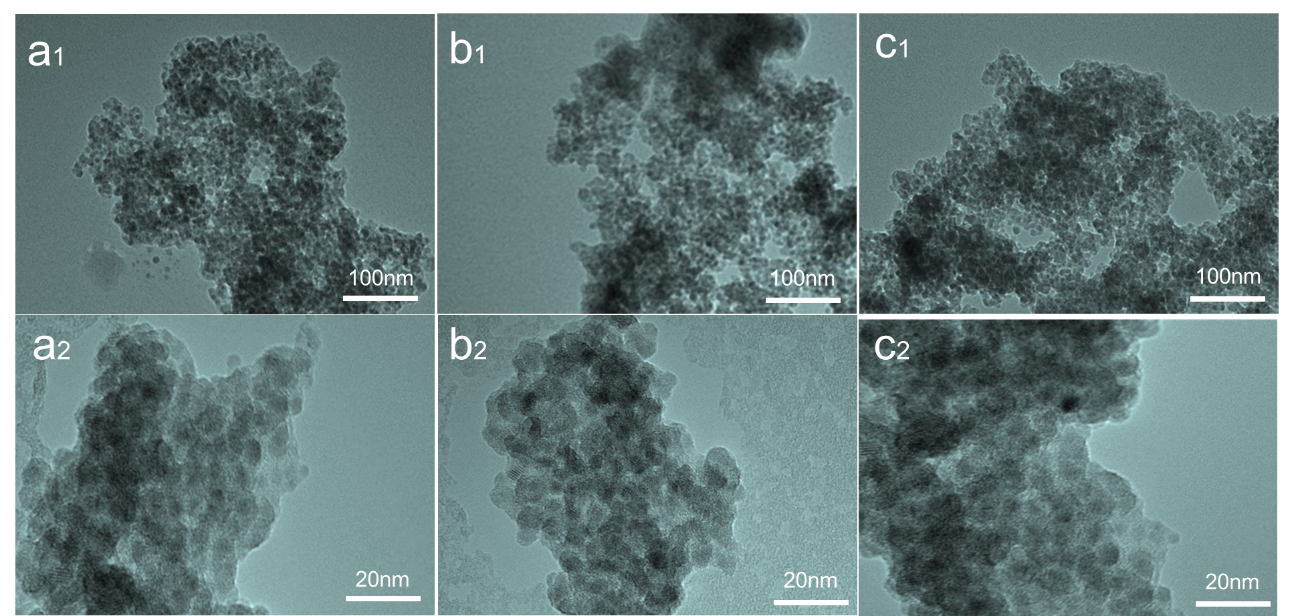
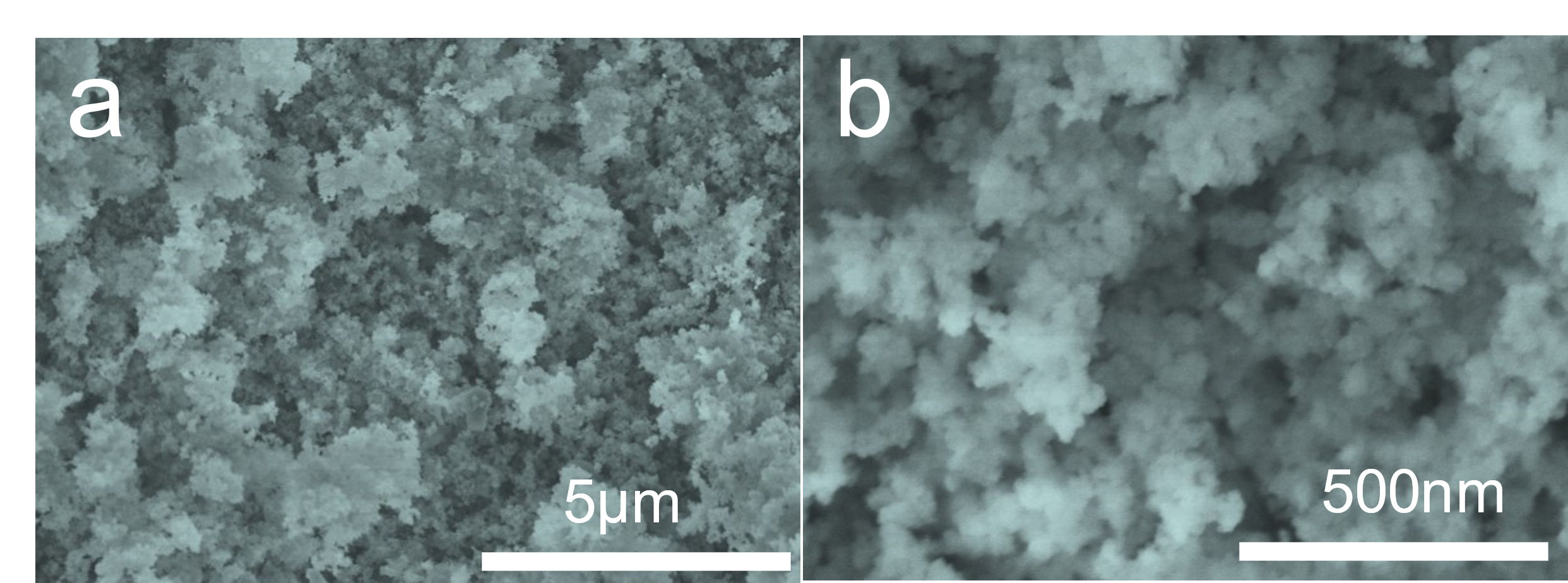
SUPPLEMENTARY MATERIAL

Theoretical Study of the Impact of Pore Size in TiO₂ Aerogels on Photocatalytic Formaldehyde Decomposition

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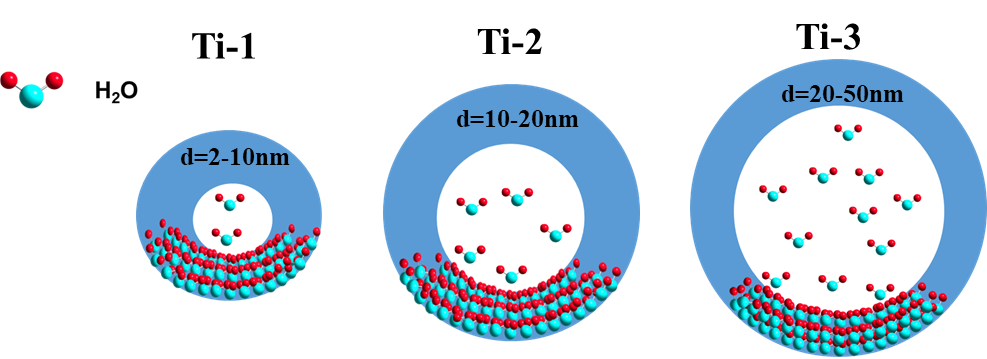
**Figure S1** TEM images of sample (a1, a1) Ti-1, (b1, b1) Ti-2 and (c1, c1) Ti-3.



**Figure S2** SEM images of sample (a, b) Ti-0.



**Figure S3** Photocatalytic decomposition of HCHO by TiO2 aerogel, from left to right are Ti-0, Ti-1, Ti-2 and Ti-3.



**Figure S4** Adsorption of water molecules by TiO2 aerogel with different pore sizes.

**Table S1** Textural properties of TiO2 aerogels.

|  |  |  |  |
| --- | --- | --- | --- |
| Sample | BET surface area (m2/g) | Average pore size (nm) | Total pore volume (cm3/g) |
| Ti-0 | 79 | 64.6 | 0.821 |
| Ti-1 | 282 | 7.3 | 0.515 |
| Ti-2 | 241 | 12.9 | 0.414 |
| Ti-3 | 268 | 48.6 | 0.386 |

**Table S2** Standard uncertainty introduced in the measurement process.

|  |  |  |
| --- | --- | --- |
| instrument | maximum permissible error (mg/ml) | standard uncertainty (mg/ml) |
| electronic balance | ±0.100 | 0.0580 |
| volumetric flask (50ml) | ±0.050 | 0.0204 |
| pipette (1ml) | ±0.007 | 0.0040 |
| pipette (5ml) | ±0.015 | 0.0087 |

**Table S3** The values of formaldehyde concentration at different points in time.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample | 0h (mmol/L) | 1h (mmol/L) | 2h (mmol/L) | 3h (mmol/L) | 4h (mmol/L) |
| Ti-0 | 100.0 | 99.2 | 98.1 | 97.8 | 97.6 |
| Ti-1 | 100.0 | 74.5 | 63.1 | 45.7 | 45.1 |
| Ti-2 | 100.0 | 91.4 | 84.7 | 82.3 | 81.5 |
| Ti-3 | 100.0 | 81.5 | 77.4 | 69.2 | 66.9 |

**Table S4** Multiple measurement data and standard uncertainty of experimental results.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample | 1st (mmol/L) | 2nd (mmol/L) | 3rd (mmol/L) | average (mmol/L) | standard uncertainty (mmol/L) |
| Ti-0 | 97.8 | 97.6 | 97.5 | 97.6 | 0.1581 |
| Ti-1 | 45.3 | 45.1 | 45.1 | 45.1 | 0.1414 |
| Ti-2 | 81.6 | 81.5 | 81.5 | 81.5 | 0.0707 |
| Ti-3 | 67.0 | 67.0 | 66.7 | 66.9 | 0.2449 |