Supporting Information

Palladium nanoparticles embedded over mesoporous TiO$_2$ for chemical fixation of CO$_2$ under atmospheric pressure and solvent-free conditions

Resmin Khatun,$^a$ Piyali Bhanja,$^b$ Paramita Mondal,$^{a,c}$ Asim Bhaumik$^{*,b}$ Debashis Das$^{*,c}$ and Sk. Manirul Islam$^{*,a}$

Thermal analysis

To understand the thermal stability of Pd@MTiO$_2$ thermogravimetric analysis has been carried out at 10 °C temperature ramp per minute under air flow in the temperature range of 25 to 800 °C. Figure S1a represents the TGA profile diagram of Pd@MTiO$_2$ material where the first weight loss up to 101 °C could be attributed to vaporization of moisture molecules from the material surface and the second weight loss from 220 to 550 °C can be ascribed to the further condensation of the TiO$_2$ framework. The third weight loss is occurred beyond 550 °C due to decomposition of the residual part of the material. Thus, TG/DTA data revealed considerably high thermal stability upto 550 °C for the Pd@MTiO$_2$ material.

![Figure S1. The TGA (a) and DTA (b) profile diagrams of Pd@MTiO$_2$ material.](image-url)
Figure S2. CO$_2$-TPD profile diagram of MTiO$_2$ material.
Figure S3. Wide angle powder XRD pattern of reused Pd@MTiO$_2$ catalyst.
Figure S4. Narrow range XPS spectra of reused Pd@MTiO₂ catalyst containing elements Pd (a), Ti (b), O (c) and full range (d) XPS spectrum (d) of reused Pd@MTiO₂.