Ti$_2$O$_3$/TiO$_2$ heterophase junction with enhanced charge separation and spatially separated active sites for photocatalytic CO$_2$ reduction

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Figure S1 TG curve of Ti$_2$O$_3$. 

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Figure S2 Raman curve of Ti$_2$O$_3$ (T) and Ti$_2$O$_3$/TiO$_2$ nanocomposites.

Figure S3 HRTEM image of T550.
Figure S4 TEM of T700.

Figure S5 Wide XPS of Ti$_2$O$_3$ (T) and Ti$_2$O$_3$/TiO$_2$ nanocomposites.
Figure S6 Band gap and partial density of states of Ti$_2$O$_3$. The calculations were performed within the framework of density functional theory (DFT) framework embedded in the CASTEP code. The exchange-correlation energy is treated with generalized gradient approximation (GGA), using spin-polarized Perdew-Burke-Ernzerhof (PBE) functional.

Figure S7 Mass spectra analyses of the carbon source of the evolved CH$_4$ and CO in the photocatalytic reduction of $^{13}$CO$_2$. 
Figure S8 Amount of products versus irradiation time of T550 for photocatalytic CO\textsubscript{2} reduction and H\textsubscript{2} production.

Figure S9 CO\textsubscript{2}-TPD of T and T550.