Highly selective aerobic oxidation of cyclohexane to cyclohexanone and cyclohexanol over V$_2$O$_5$@TiO$_2$ under simulated solar light irradiation

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Figure S1. XPS spectra of Ti2p in the TiO₂ and 0.01-V₂O₅@TiO₂.

Figure S2. XPS spectra of O1s in the TiO₂ and 0.01-V₂O₅@TiO₂.
**Figure S3.** HRTEM images of 0.03-V$_2$O$_5$@TiO$_2$ (a), 0.05-V$_2$O$_5$@TiO$_2$ (b), 0.07-V$_2$O$_5$@TiO$_2$ (c).

**Figure S4.** EDX images of 0.03-V$_2$O$_5$@TiO$_2$.

No obvious aggregation of V species in the catalysts of 0.03-V$_2$O$_5$@TiO$_2$ is observed in Figure S3a. However, with the increasing of V content, it is found from Figure S 3b and Figure S 3c that aggregation of V species exists in catalyst, which would be detrimental to photocatalytic oxidation of cyclohexane. Meanwhile, to further understand the catalysts of 0.03-V$_2$O$_5$@TiO$_2$, the element mapping was performed in Figure S4, from which we could see there are slightly aggregation in the catalysts.