In situ decomposition of bromine-substituted catechol to increase the activity of titanium dioxide catalyst for visible-light-induced aerobic conversion of toluene to benzaldehyde

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**Fig. S1.** Raman spectra of (a) bare TiO$_2$, (b) Br$_x$Cat-TiO$_2$-TiO$_2$, and the TiO$_2$ powder obtained after (c) 1, (d) 3, (e) 7, and (f) 15 hours of the reaction using Br$_x$Cat-TiO$_2$.

**Fig. S2.** EDS spectra of Br$_x$Cat-TiO$_2$ (black line) and re-TiO$_2$ (red line).
Fig. S3. XPS spectra of bare TiO$_2$ (a), Br$_4$Cat-TiO$_2$ (b), and re-Br$_4$Cat-TiO$_2$ (c). Bare TiO$_2$ was measured after the same treatment as Br$_4$Cat-TiO$_2$ using acetone instead of an acetone solution of Br$_4$Cat.