Electronic Supplementary Material (ESI) for RSC Advances

Characteristics of the charge transfer surface complex on titanium (IV) dioxide for the visible-light induced chemo-selective oxidation of benzyl alcohol

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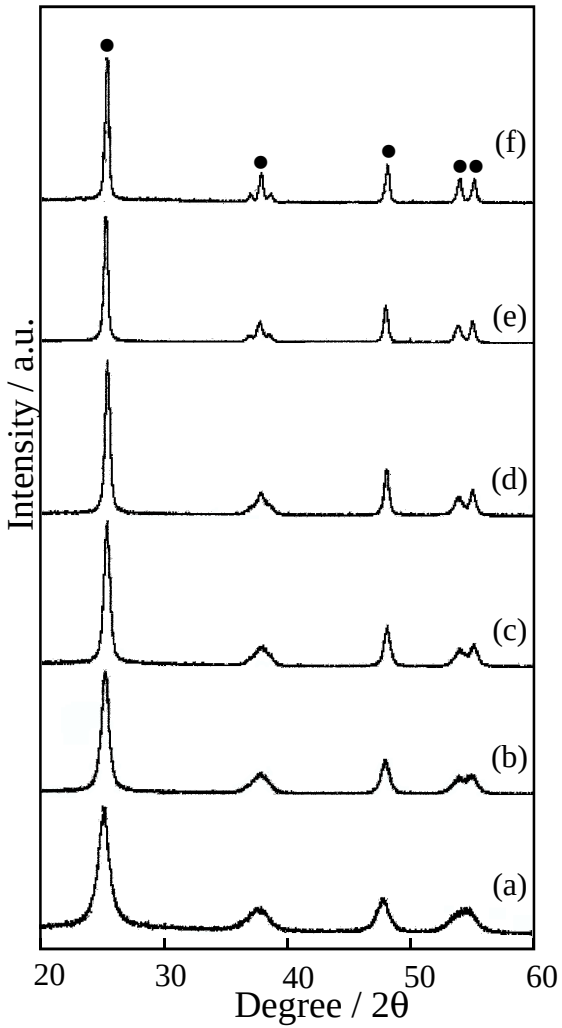

Figure S. 1 XRD patterns of (a) un-treated TiO_2, (b) TiO_2(573), (c) TiO_2(673), (d) TiO_2(773), (e) TiO_2(873) and (f) TiO_2(973). ●: anatase structure

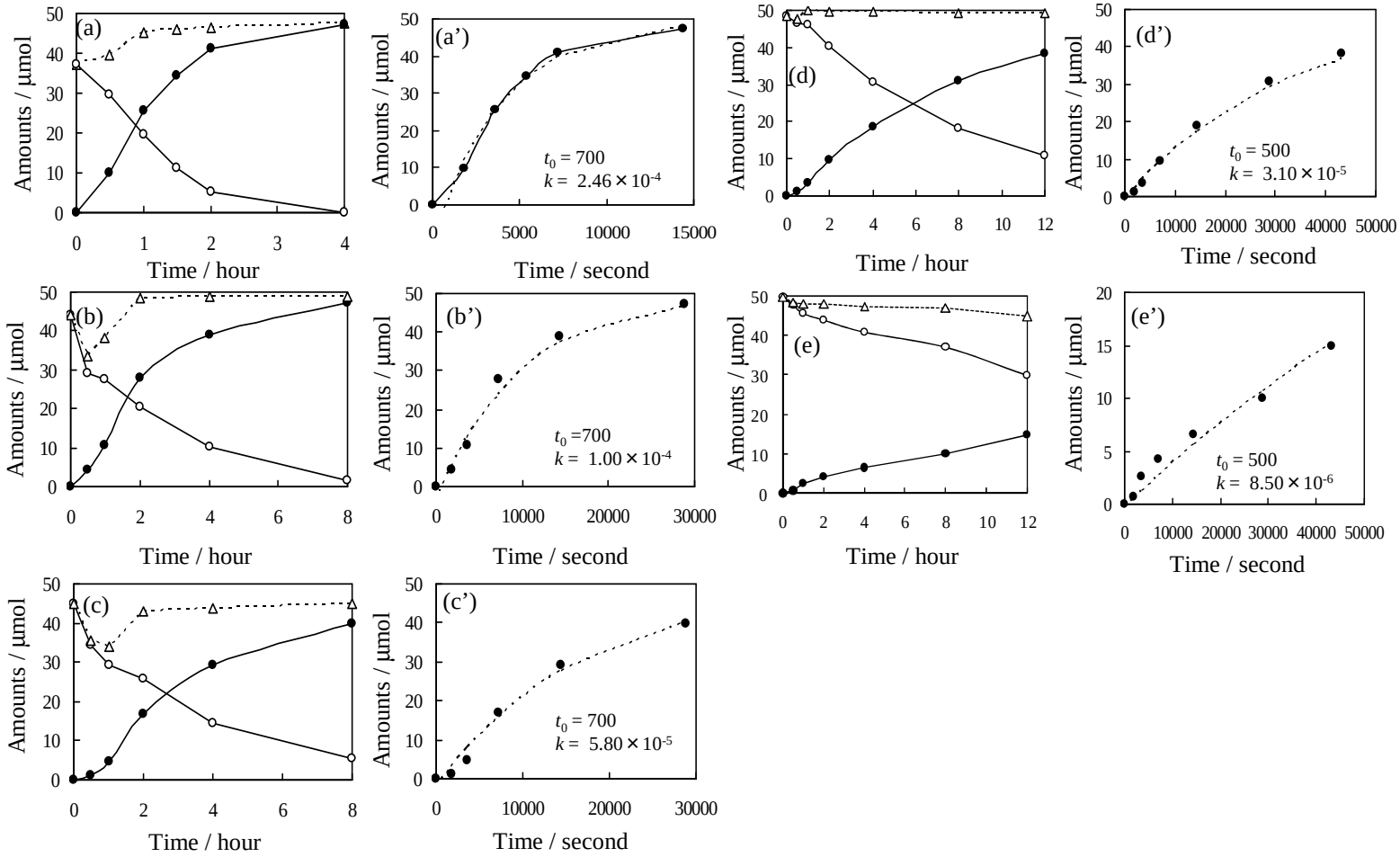

Figure S. 2 Time profile for the photocatalytic oxidation of benzyl alcohol on the heat-treated TiO_2 (a - e) in the presence of O_2 under visible light irradiation, and the simulation (broken line) of amounts of photo-formed benzaldehyde (a'-e'). a, a': un-treated TiO_2, b, b': TiO_2(673), c, c': TiO_2(773), d, d': TiO_2(873), e, e': TiO_2(973). ●: amount of benzaldehyde; ○: amount of benzyl alcohol; △: amount of benzyl alcohol and benzaldehyde in total.

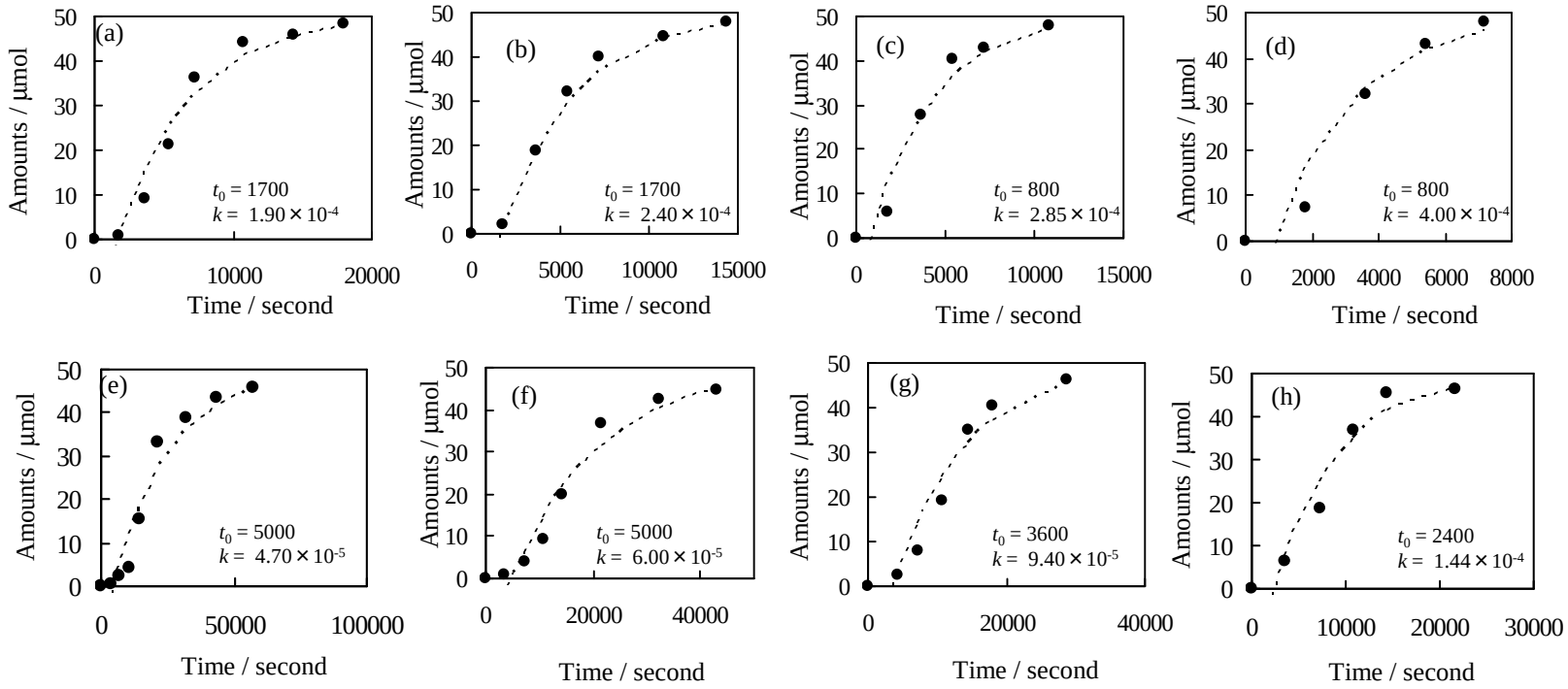

Figure S. 3 Time profile for the the photocatalytic oxidation of normal benzyl alcohol (a - d) and α, α-d2 benzyl alcohol (e - h) on TiO_2 with experiment (●) and its simulation (broken line). The reaction temperatures were controlled at 283 K (a, e), 293 K (b, f), 303 K (c, g) and 313 K (d, h).

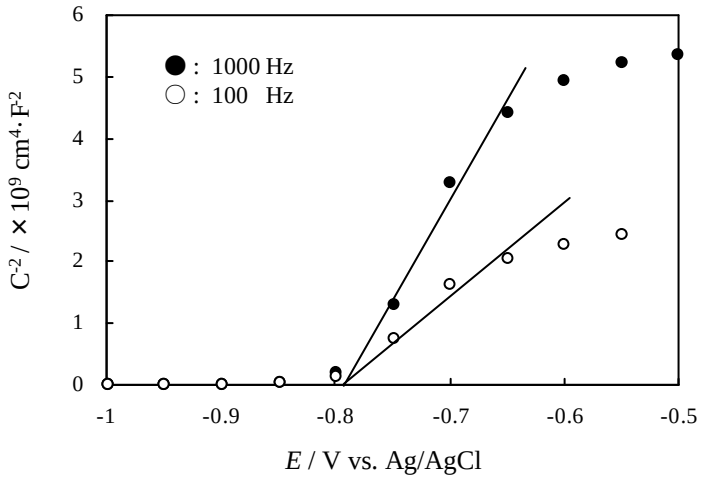

Figure S. 4 Mott-Schottky plots of the TiO_2 film electrode at the modulation frequency of 100 and 1000 Hz. The measurements were performed in acetonitrile solution involving 0.1 M $LiClO_4$ and 5 mM benzyl alcohol (pH = 3.8).

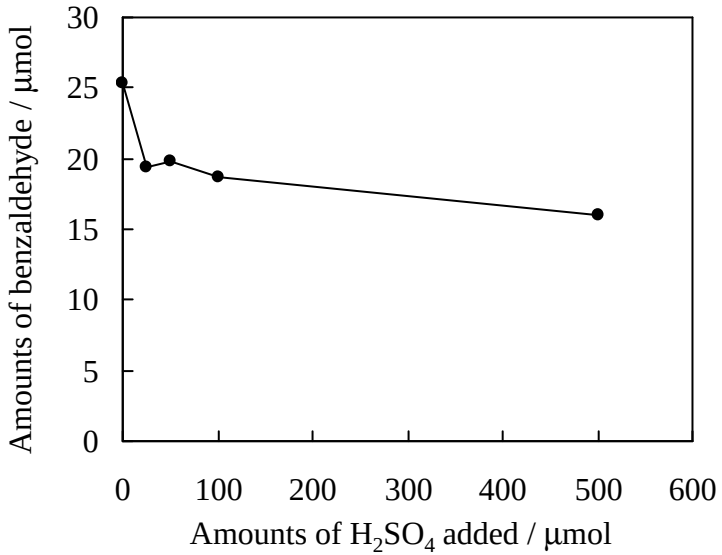

Figure S. 5 Plots for the amount of photo-formed benzaldehyde as a function of the amounts of conc. H_2SO_4 added. The photocatalytic oxidation of benzyl alcohol (50 μmol) was performed in acetonitrile solution on TiO_2 (50 mg) for 1h.