Electronic Supporting Information

Catalysis in flow: Effect of O_2 on the catalyst actiivty of $Ru(OH)_x/\gamma$-Al_2O_3 during the aerobic oxidation of an alcohol

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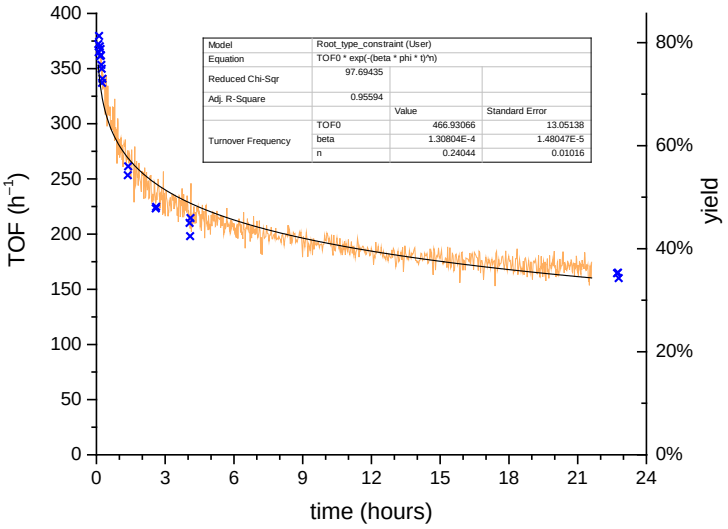
Characterzation of $Ru(OH)_x/\gamma$-Al_2O_3 and the flow characteristic of the X-Cube™ flow reactor have been previously reported.[1]

[1] N. Zotova, K. Hellgardt, G. H. Kelsall, A. S. Jessiman, and K. K. Hii, *Green Chem*. 2010, **12**, 2157, and supporting information.

Table S1. Calculations of maximum O_2 concentration in *tert*-amyl alcohol using equation-of-state-calculations (Peng-Robinson model).

	25 ºC in solution	120 ºC in solution	150 ºC in solution	180 ºC in solution
10 bar	193.8	147.5	112.6	42.5
25 bar	474.8	411.9	391.7	347.9



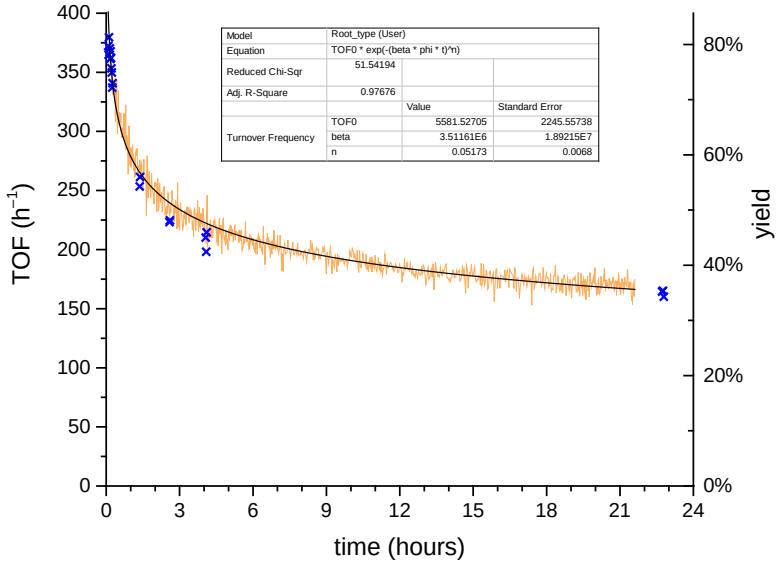


Figure S1. Fitting of Eqn 3 to experimental data. Top: Applying a constraint of $TOF_0 \leq \phi_{BnOH}$.Bottom: relaxing the constraint of TOF resulted a reasonably good fit (R^2 = 0.976), but an unrealistic TOF_0 (5581, which is >100% theoretical conversion).

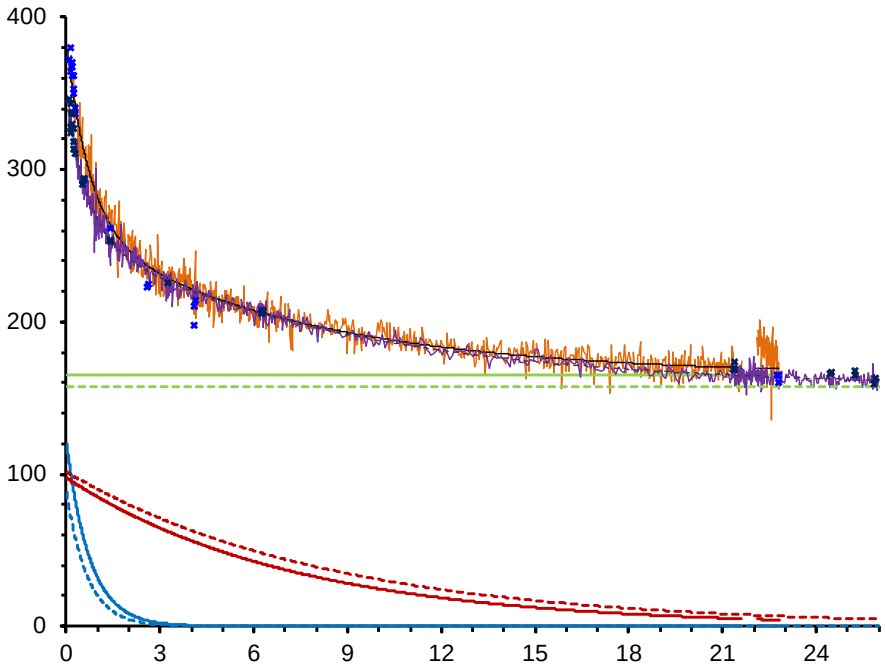


Figure S2. Two separate experiments recorded at 180 °C, 25 bar O_2 (test of reproducibility).

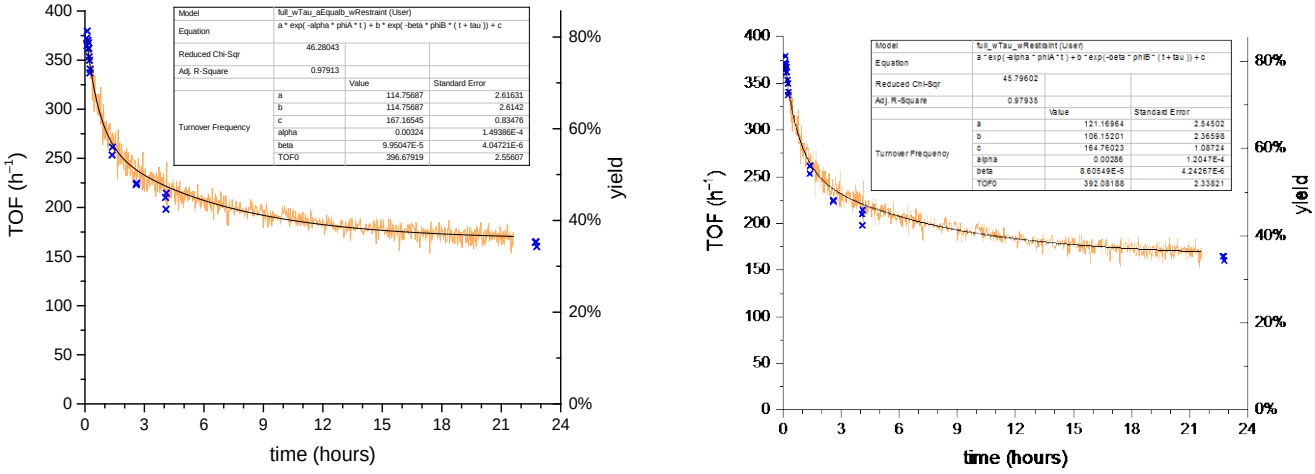


Figure S3. Fit of Eqn 5 (left) and Eqn 6 (right) to experiment data collected at 180 °C, 25 bar O_2.

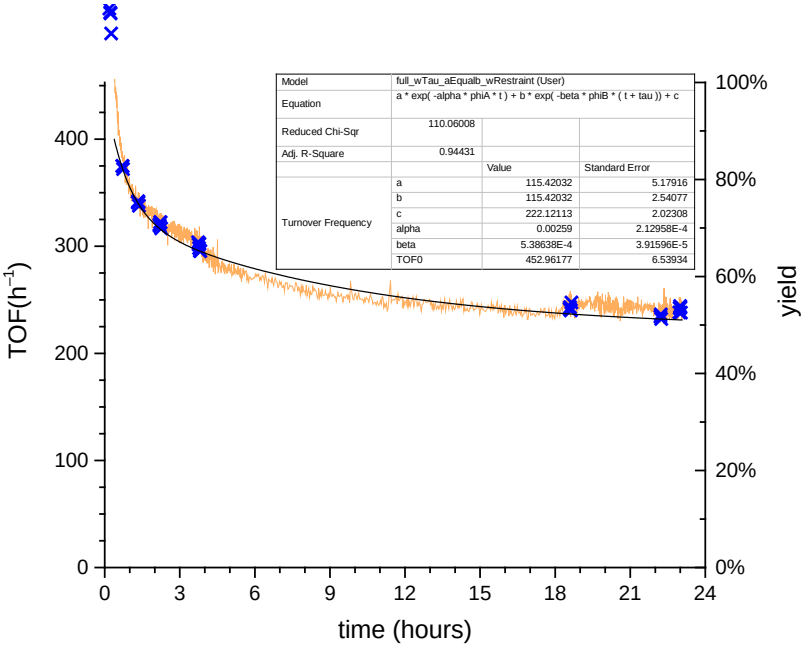


Figure S4. Fit of Eqn 5 to experiment data collected at 180 °C, 10 bar O_2.

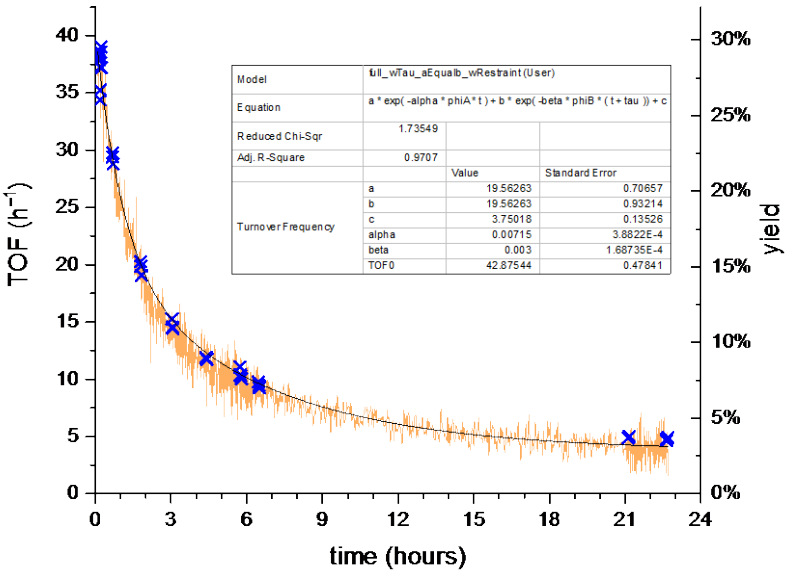
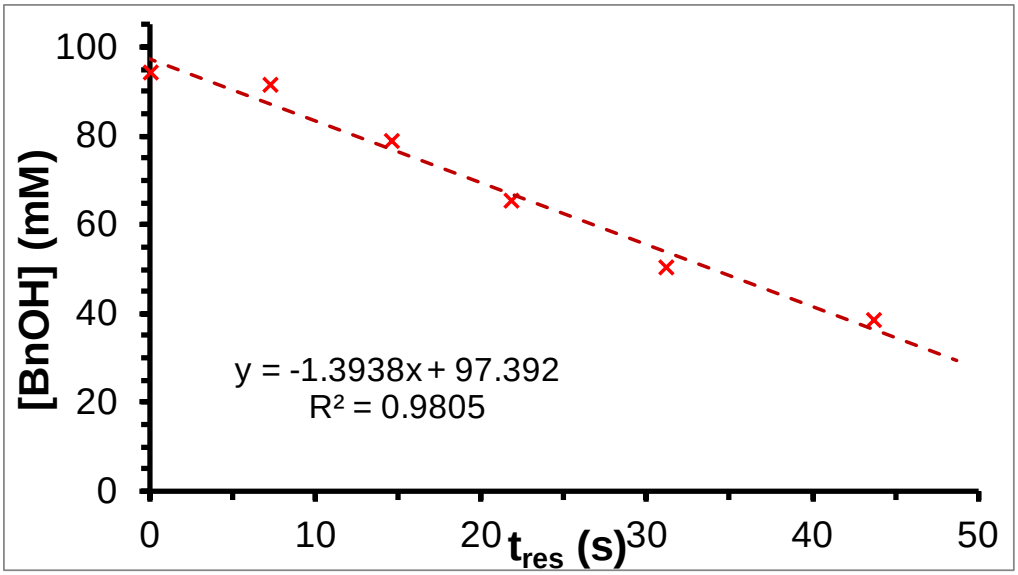
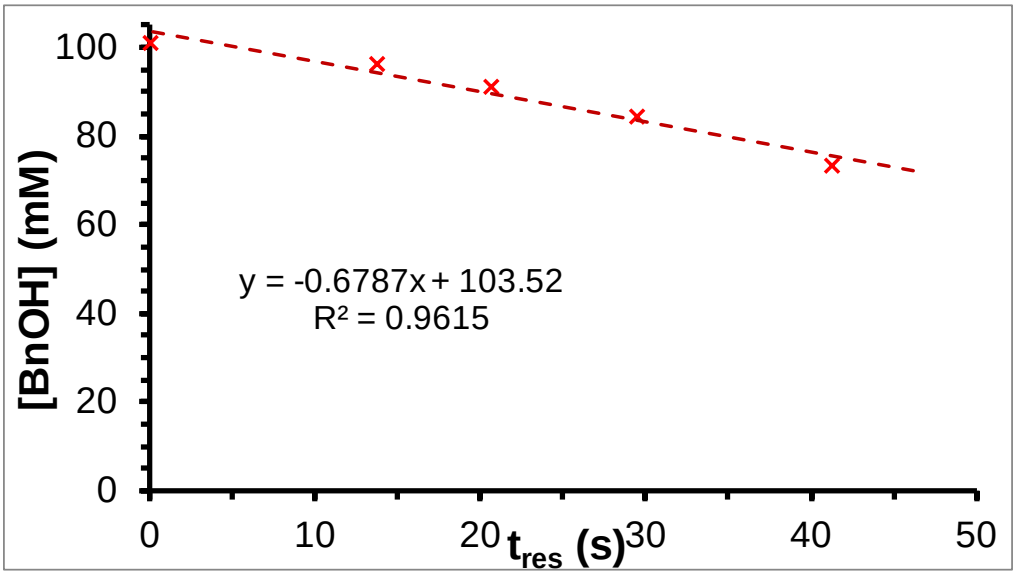


Figure S5. Fit of Eqn 5 to experiment data collected at 120 °C, 10 bar O_2.





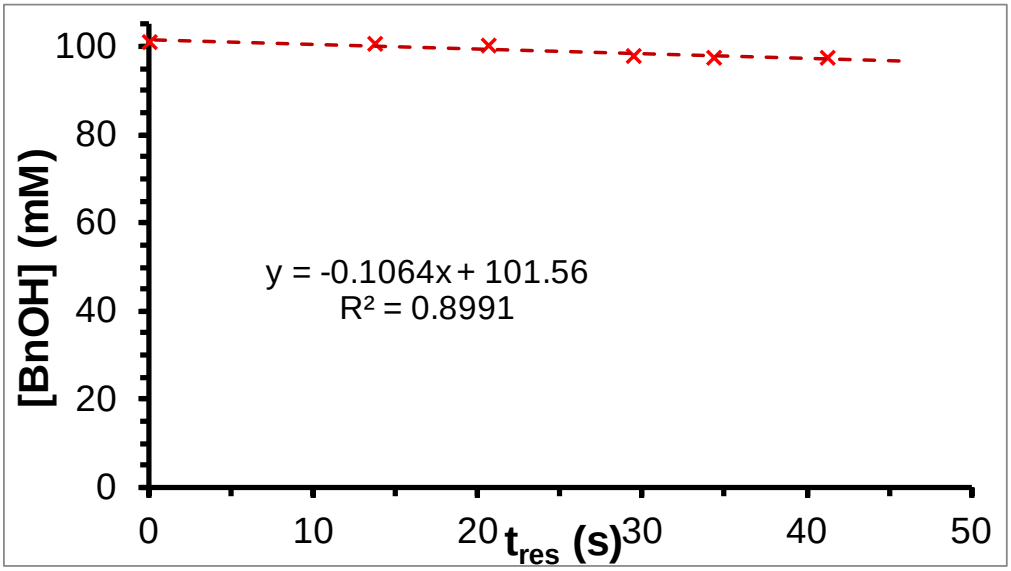


Figure S6. Conversion graphs for the reaction at 180 (top), 150 (middle) and 120 (bottom) °C, 10 bar O_2.

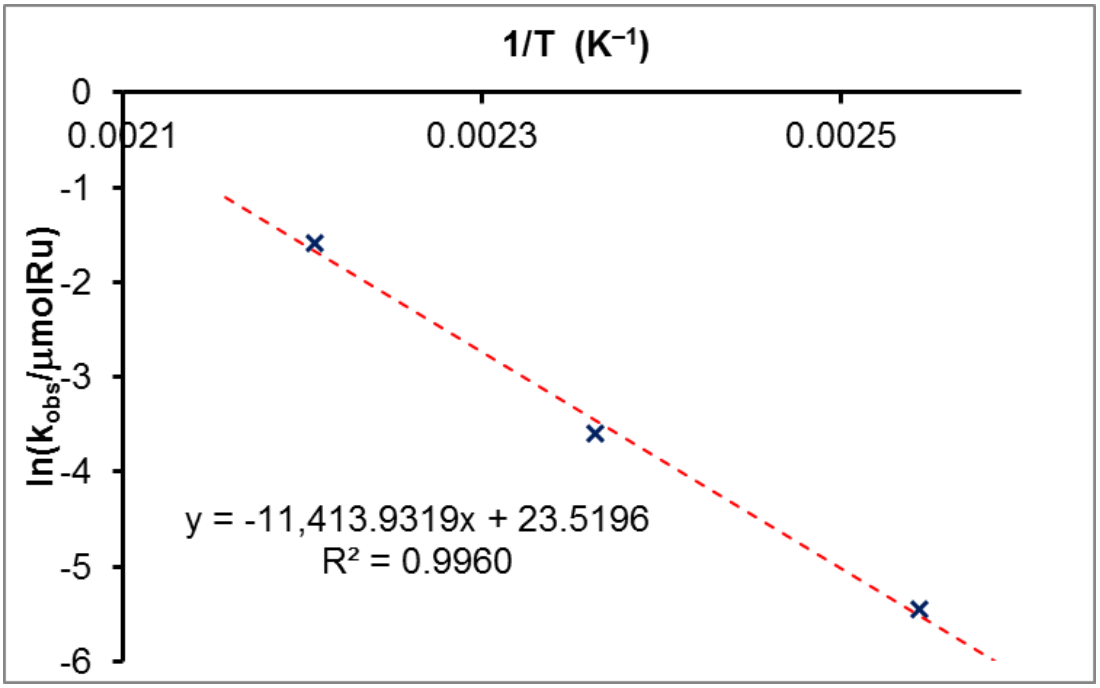


Figure S7. Arrhenius plot (10 bar O_2).