Supplementary information for:

Modelling and optimisation of the sol-gel conditions for synthesis of semi-hexagonal titania based nano-catalyst for esterification reaction

Hamed Nayebzadeh[1,*], Abbas Rohani[2], Aliakbar Sistani[3], Ali Hassanpour[4], Jabbar Gardy[4,*]

[1] Faculty of Material and Chemical Engineering, Esfarayen University of Technology, P.O.Box 9661898195, Esfarayen, North Khorasan, Iran.
[2] Department of Biosystems Engineering, Faculty of Agriculture, Ferdowsi University of Mashhad, P.O.Box 9177948974, Mashhad, Iran.
[3] Department of Chemical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, P.O.Box 9177948974, Mashhad, Iran.
[4] School of Chemical and Process Engineering, Faculty of Engineering and Physical Sciences, University of Leeds, LS2 9JT, Leeds, UK.
* Correspondence: H.N.: h.nayebzadeh@esfarayen.ac.ir, Tel.: 00985837266531; J.G.: j.gardy@leeds.ac.uk; Tel.: 00447392333760;

Table S1. The level of depend variables used for synthesis the calcium/titania-zirconia catalyst and their activity in the esterification reaction

gelting temp	complex time	acid ratio (CM)	calcination temp	Yield
80	2	0.75	0	61.8
80	2	1	0	62.6
80	2	1.5	0	70.6
80	2	2	0	53.7
80	2	0.75	0	63
80	2	1	0	61.7
80	2	1.5	0	69.1
80	2	2	0	55.2
80	2	0.75	0	61.8
80	2	1	0	60.4
80	2	1.5	0	71.3
80	2	2	0	53.4
60	2	1.5	0	62.4
70	2	1.5	0	73.3
80	2	1.5	0	70.6
100	2	1.5	0	49.8
60	2	1.5	0	60.6
70	2	1.5	0	75.4
80	2	1.5	0	69.1
100	2	1.5	0	53.1
60	2	1.5	0	59.1
70	2	1.5	0	73.9

80	2	1.5	0	71.3
100	2	1.5	0	51.8
70	1	1.5	0	56.9
70	2	1.5	0	73.3
70	3	1.5	0	77.4
70	3	1.5	0	77.3
70	1	1.5	0	60.8
70	2	1.5	0	75.4
70	3	1.5	0	79.1
70	3	1.5	0	78.8
70	1	1.5	0	61.2
70	2	1.5	0	73.9
70	3	1.5	0	78.5
70	3	1.5	0	78.7
70	3	1.5	0	77.4
70	3	1.5	200	79.2
70	3	1.5	300	81.3
70	3	1.5	400	96.4
70	3	1.5	500	96.6
70	3	1.5	600	91.3
70	3	1.5	0	79.1
70	3	1.5	200	80.6
70	3	1.5	300	80.9
70	3	1.5	400	97.5
70	3	1.5	500	95.3
70	3	1.5	600	90.7
70	3	1.5	0	78.5
70	3	1.5	200	79.6
70	3	1.5	300	82.2
70	3	1.5	400	97.3
70	3	1.5	500	96.4
70	3	1.5	600	92.7
60	1	1	300	47.8
80	2	1	400	84.4
100	3	1	500	68.8
60	2	1.5	500	82.1
80	3	1.5	300	83.7
100	1	1.5	400	75.3
60	3	2	400	73.1
80	1	2	500	76.5
100	2	2	300	46.6