

# Macrokinetic effects in perhydro-N-ethylcarbazole dehydrogenation and H<sub>2</sub> productivity optimization by using egg-shell catalysts

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## Supporting Information

**Table S1 – Detailed data on the conformity of temperature programmed experiments:** Hydrogen flow rate (H<sub>2</sub>-FR), counts (CTS) and standard deviation (STD); Reaction temperature: 220 °C – 261 °C; H12-NEC flow rate: 0.6 mL min<sup>-1</sup>; Catalyst: 44 μm; 30 catalyst spheres; Platinum mass: 1.0 mg.

Reaction temp. °C	Upward-ramp			Downward-ramp			All values		
	H <sub>2</sub> -FR mL min <sup>-1</sup>	CTS n	STD mL min <sup>-1</sup>	H <sub>2</sub> -FR mL min <sup>-1</sup>	CTS n	STD mL min <sup>-1</sup>	H <sub>2</sub> -FR mL min <sup>-1</sup>	CTS n	STD mL min <sup>-1</sup>
220	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
221	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
222	11.3	5	1.34	12.0	3	0.36	11.6	8	1.13
223	12.1	15	1.55	11.8	17	2.15	11.9	32	1.90
224	12.7	16	2.05	13.9	21	1.49	13.4	37	1.86
225	13.8	20	1.33	15.3	15	1.35	14.4	35	1.53
226	14.9	17	1.90	16.8	18	1.42	15.9	35	1.91
227	16.3	14	1.46	18.6	33	1.33	17.9	47	1.73
228	18.4	16	1.48	20.8	25	1.66	19.9	41	1.97
229	20.1	16	1.29	23.2	16	1.29	21.7	32	2.04
230	21.9	17	1.27	25.1	18	1.37	23.5	35	2.09
231	23.9	15	1.26	26.8	14	1.18	25.3	29	1.92
232	25.6	16	0.97	28.7	13	1.32	27.0	29	1.89
233	28.3	17	1.06	30.2	17	1.13	29.3	34	1.44
234	30.3	16	1.09	32.0	16	1.03	31.2	32	1.37
235	32.5	16	1.71	33.9	20	1.32	33.3	36	1.67
236	34.1	17	1.22	36.8	14	1.70	35.3	31	1.98
237	36.6	15	1.19	38.1	18	0.81	37.4	33	1.26
238	38.1	15	1.14	40.3	12	1.02	39.1	27	1.53
239	40.9	17	1.81	43.1	20	1.49	42.1	37	1.97
240	42.5	16	1.18	44.9	17	1.50	43.7	33	1.78
241	45.0	19	1.26	47.0	14	1.71	45.8	33	1.78
242	47.3	9	0.95	49.1	18	1.43	48.5	27	1.54
243	49.7	17	1.88	51.4	15	1.70	50.5	32	1.99
244	52.4	15	1.86	52.8	14	1.16	52.6	29	1.57
245	54.2	15	1.96	56.0	19	1.64	55.2	34	2.01
246	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
247	56.3	20	2.32	57.7	19	1.33	57.0	39	2.03
248	59.5	15	1.91	59.2	11	1.39	59.4	26	1.71
249	62.0	22	1.55	62.3	19	1.89	62.1	41	1.73
250	64.2	13	1.46	66.1	18	3.14	65.3	31	2.75
251	66.5	16	1.33	68.2	15	2.17	67.3	31	1.98
252	69.4	17	1.97	69.1	19	1.49	69.3	36	1.74
253	71.4	14	1.64	73.6	16	2.28	72.5	30	2.29
254	73.4	21	2.54	73.9	18	1.04	73.6	39	2.01
255	77.0	17	3.04	76.0	15	1.45	76.5	32	2.48
256	79.7	17	2.13	78.9	18	1.41	79.3	35	1.84
257	81.3	10	0.99	80.8	16	1.47	81.0	26	1.33
258	82.0	11	1.20	83.2	20	1.89	82.8	31	1.77
259	86.9	12	3.07	86.1	13	1.46	86.5	25	2.40
260	86.4	10	1.46	87.5	11	1.24	88.4	49	3.72
261	n/a	n/a	n/a	90.3	1	0	88.6	163	3.53