

Article

Supplementary material: Properties of Carbon-supported Precious Metals Catalysts under Reductive Treatment and Their Influence in the Hydrodechlorination of Dichloromethane

Alejandra Arevalo-Bastante, Maria Martin-Martinez*, M. Ariadna Álvarez-Montero, Juan J. Rodriguez and Luisa M. Gómez-Sainero

Departamento de Ingeniería Química, Facultad de Ciencias, Universidad Autónoma de Madrid, Cantoblanco, 28049 Madrid, Spain; alejandrarevalo.b@gmail.com (A.A.-B.); ariadna.alvarez@uam.es (M.A.A.-M.); juanjo.rodriguez@uam.es (J.J.R.); luisa.gomez@uam.es (L.M.G.-S.)

* Correspondence: maria.martin.martinez@uam.es; Tel.: +34-91-497-5527

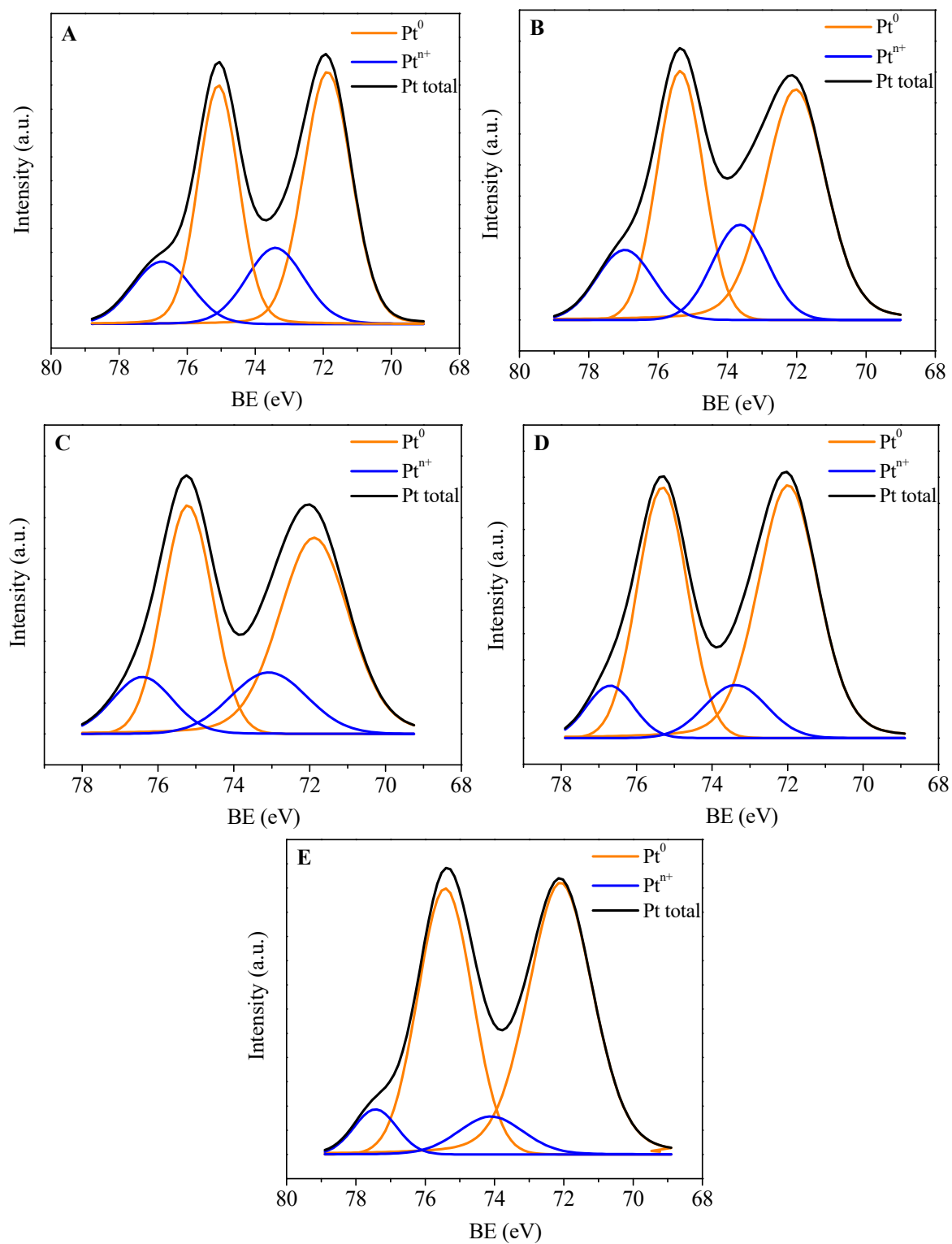


Figure S1. XPS deconvolution of Pt 4f on Pt/C catalyst reduced at: 250 °C (A), 300 °C (B), 350 °C (C), 400 °C (D) and 450 °C (E).

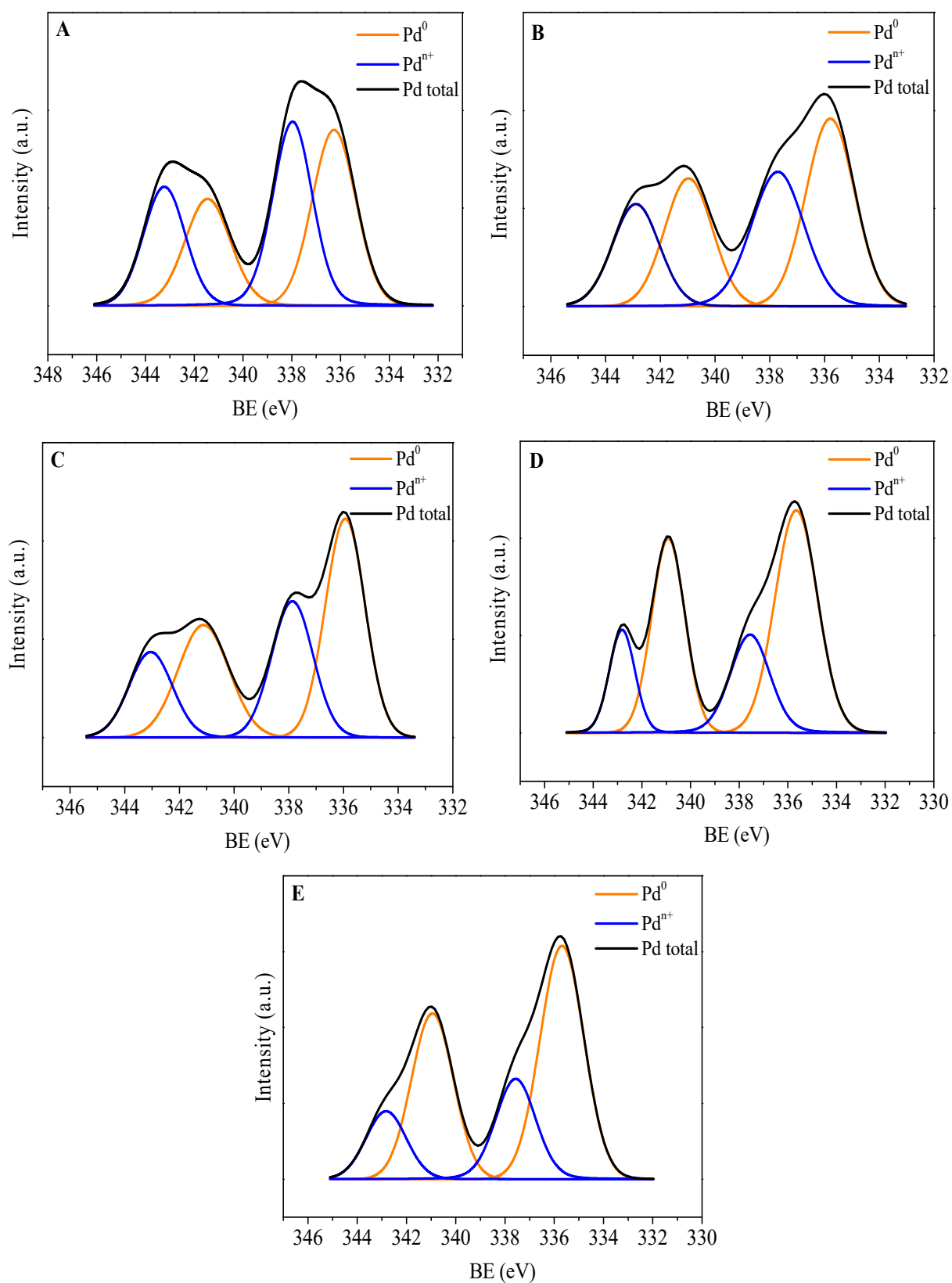


Figure S2. XPS deconvolution of Pd 3d on Pd/C catalyst reduced at: 250 °C (A), 300 °C (B), 350 °C (C), 400 °C (D) and 450 °C (E).

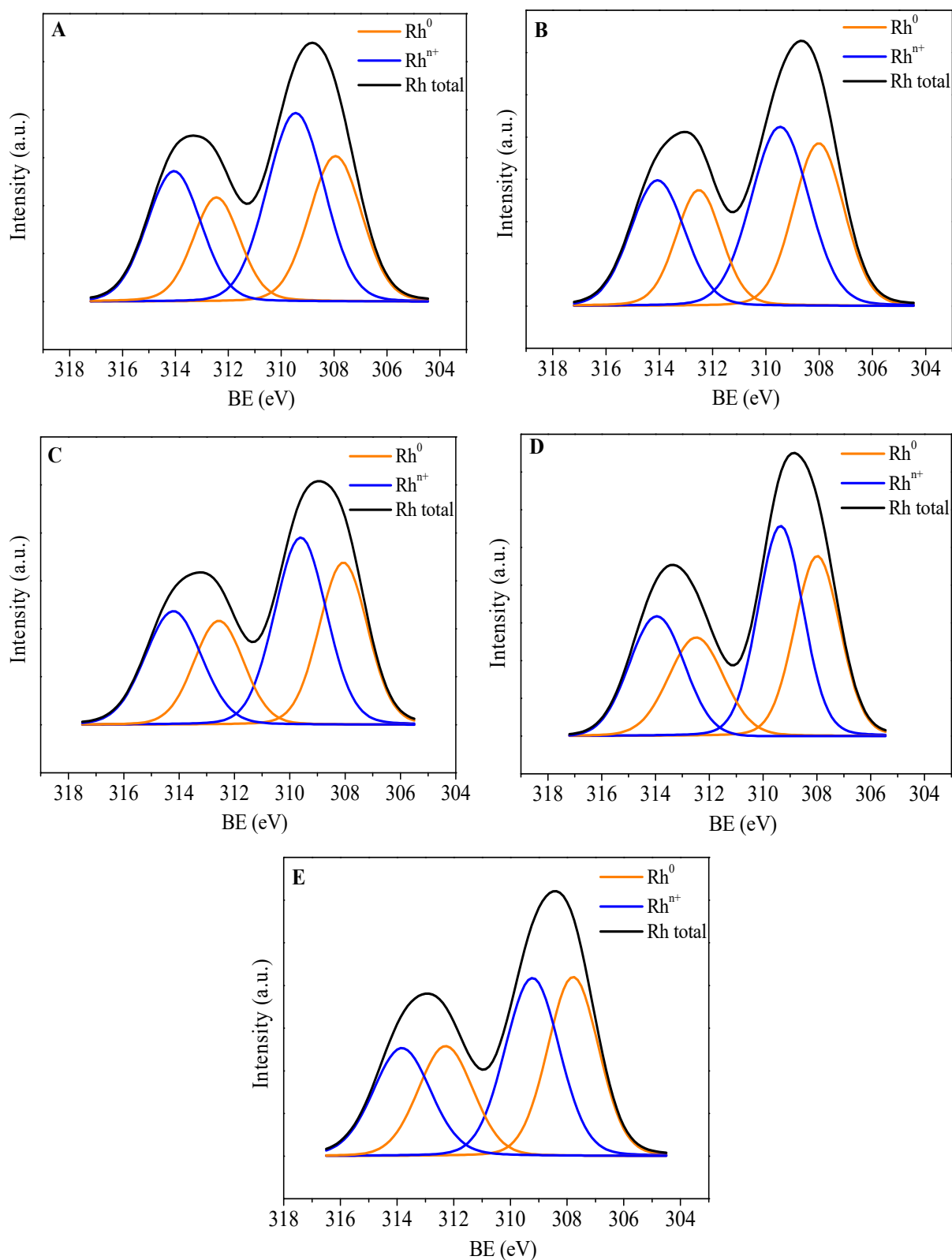


Figure S3. XPS deconvolution of Rh 3d on Rh/C catalyst reduced at: 250 °C (A), 300 °C (B), 350 °C (C), 400 °C (D) and 450 °C (E).

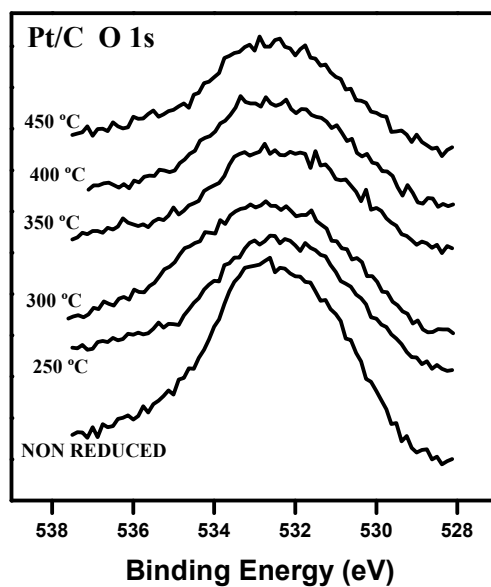


Figure S4. XPS spectra of O 1s on Pt/C catalyst reduced at different temperatures.

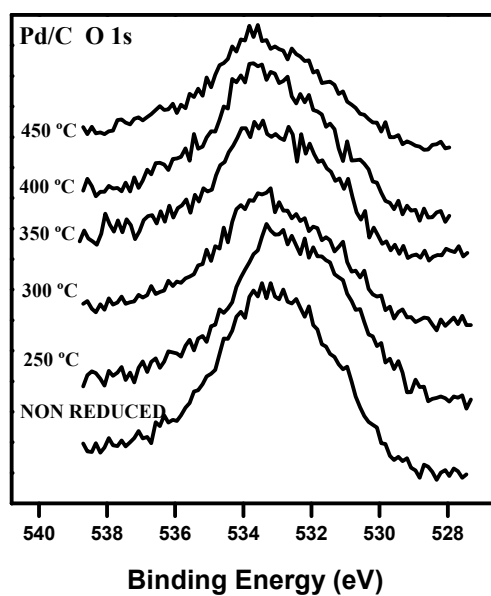


Figure S5. XPS spectra of O 1s on Pd/C catalyst reduced at different temperatures.

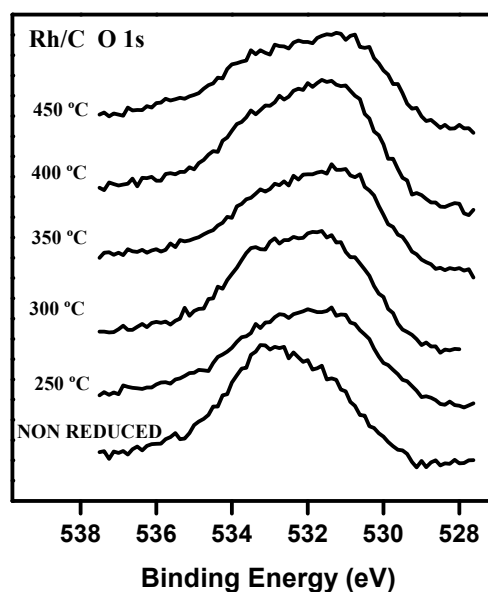


Figure S6. XPS spectra of O 1s on Rh/C catalyst reduced at different temperatures.

Table S1. Initial conversions and selectivities to reaction products in the HDC of DCM with Pt/C catalyst reduced at different temperatures.

T_r^* (°C)	T_r^* (°C)	X_{DCM} (%)	CH_4 (%)	MCM (%)
150	250	4.4	87.1	12.9
	300	6.8	85.6	14.4
	350	7.7	85.9	14.1
	400	8.1	86.5	13.5
	450	8.5	88.2	11.8
175	250	8.9	87.6	12.4
	300	9.2	85.8	14.2
	350	9.8	86.5	13.5
	400	12.2	86.7	13.3
	450	15.4	89.0	11.0
200	250	10.4	88.1	11.9
	300	14.0	85.0	15.0
	350	16.4	87.0	13.0
	400	19.0	86.9	13.1
	450	19.2	89.5	10.5
225	250	20.3	89.2	10.8
	300	23.4	87.6	12.4
	350	25.7	88.7	11.3
	400	29.2	88.6	11.4
	450	32.1	90.2	9.8
250	250	35.6	90.5	9.5
	300	38.5	89.9	10.1
	350	40.6	90.4	9.6

400	45.3	90.7	9.3
450	50.1	91.8	8.2

*T_r: reaction temperature; T_R: reduction temperature

Table S2. Initial conversions and selectivities to reaction products in the HDC of DCM with Pd/C catalyst reduced at different temperatures.

T _r (°C)	T _R (°C)	X _{DCM} (%)	CH ₄ (%)	C ₂ H ₆ (%)	C ₃ H ₈ (%)	MCM (%)
150	250	11.8	80.6	3.0	0	16.4
	300	12.0	77.0	0	0	23.0
	350	4.8	69.5	0	0	30.5
	400	2.8	65.3	0	0	34.7
	450	2.3	63.8	0	0	36.2
175	250	23.8	80.8	5.7	0	13.4
	300	20.6	77.1	4.3	0	18.6
	350	8.5	72.1	2.5	0	25.3
	400	8.0	70.0	0	0	30.0
	450	6.2	68.6	0	0	31.4
200	250	43.8	79.3	9.9	0	10.8
	300	32.8	77.2	7.5	0	15.4
	350	19.0	74.6	4.6	0	20.8
	400	13.6	72.7	2.8	0	24.5
	450	10.4	72.3	2.0	0	25.7
225	250	64.3	75.0	15.2	0.8	9.0
	300	48.9	74.9	11.9	0.7	12.5
	350	32.5	76.2	7.6	0	16.2
	400	24.4	75.5	5.0	0	19.5
	450	18.5	75.4	3.7	0	20.9
250	250	83.6	71.1	20.1	1.2	7.6
	300	68.9	71.5	17.4	1.1	10.0
	350	52.4	75.3	11.8	0.8	12.2
	400	36.2	76.2	7.9	0.2	15.7
	450	29.1	76.9	6.0	0	17.0

Table S3. Initial conversions and selectivities to reaction products in the HDC of DCM with Rh/C catalyst reduced at different temperatures.

T _r (°C)	T _R (°C)	X _{DCM} (%)	CH ₄ (%)	C ₂ H ₆ (%)	C ₃ H ₈ (%)	C ₄ H ₁₀ (%)	MCM (%)
150	250	19.6	74.6	7.3	1.7	0.6	15.7
	300	18.2	77.0	7.4	1.7	0.1	13.7
	350	16.7	77.8	7.2	1.6	0.4	13.3
	400	16.7	76.6	6.9	1.5	0.5	14.4

	450	17.1	77.2	6.3	1.4	0.4	14.7
	250	33.7	74.2	11.3	3.1	0.8	10.3
	300	29.7	75.6	9.4	2.6	0.7	11.7
175	350	33.7	77.1	10.2	2.6	0.7	10.0
	400	31.6	75.9	9.9	2.5	0.7	11.0
	450	33.5	76.1	9.4	2.6	0.8	11.1
	250	62.3	71.5	15.3	4.4	1.1	7.8
	300	57.6	73.3	13.1	3.8	1.0	8.7
200	350	60.1	75.0	13.6	3.8	0.9	7.6
	400	57.1	74.0	12.9	3.6	0.9	8.5
	450	59.7	74.4	12.1	3.8	1.1	8.6
	250	90.3	68.1	19.0	5.7	1.4	5.8
	300	85.9	70.3	16.6	5.1	1.3	6.7
225	350	87.3	72.6	16.9	4.6	1.0	5.9
	400	84.8	71.7	16.0	4.7	1.1	6.5
	450	86.2	72.5	14.8	4.9	1.3	6.6
	250	99.4	64.8	22.1	6.9	1.7	4.6
	300	98.5	67.5	19.4	6.3	1.6	5.3
250	350	98.7	71.0	19.1	5.3	1.1	4.6
	400	97.8	69.1	18.7	5.8	1.4	5.1
	450	98.0	71.1	16.6	5.6	1.5	5.2



© 2018 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).