

Co-Hydroprocessing of Fossil Middle Distillate and Bio-Derived Durene-Rich Heavy Ends under Hydrotreating Conditions

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Supplementary Materials

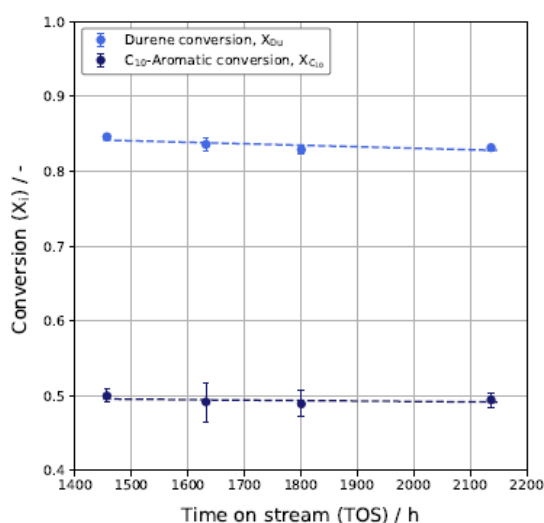


Figure S1. Durene and C_{10} aromatics conversion at a reference point for the co-HP of 15 wt.% durene and 85 wt.% MD. Experimental conditions: $T = 380\text{ }^{\circ}\text{C}$, $LHSV = 0.25\text{ h}^{-1}$, $p_{H_2} = 59\text{ bar}$, $p_{Ar} = 3.9\text{ bar}$ and $V_{H_2}/V_{Feed} = 1042\text{ Nm}^3\text{ m}^{-3}$.

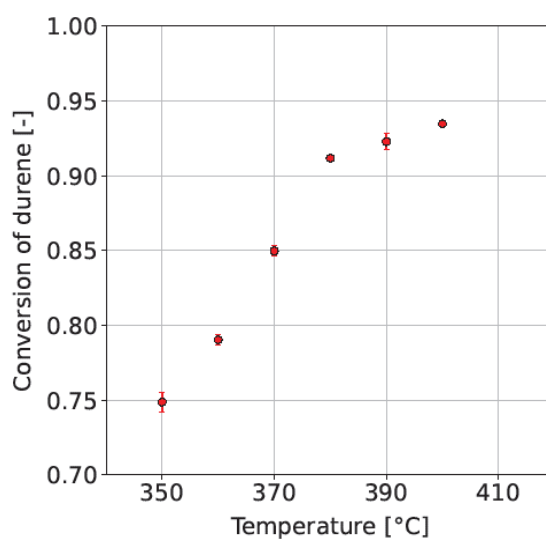


Figure S2. Duren conversion under variation of temperature for the co-HP of 15 wt.% durene and 85 wt.% MD. Experimental conditions: $LHSV = 0.4\text{ h}^{-1}$, $p_{H_2} = 59\text{ bar}$, $p_{Ar} = 3.9\text{ bar}$ and $V_{H_2}/V_{Feed} = 1042\text{ Nm}^3\text{ m}^{-3}$.

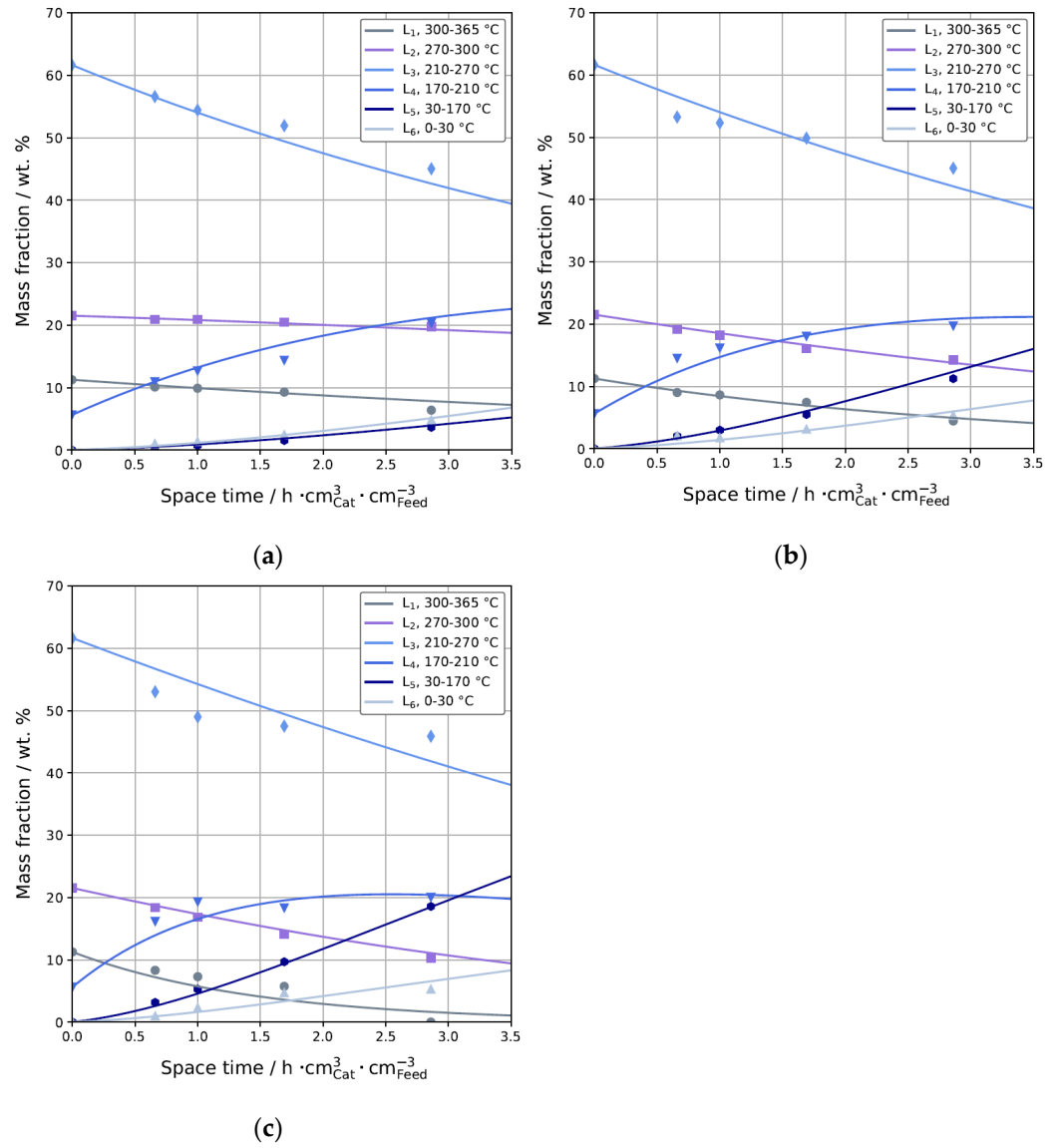


Figure S3. Fitting results for the reduced model at (a) 350 °C, (b) 380 °C, and (c) 390 °C for the co-HP of 15 wt.% durene and 85 wt.% MD. Experimental conditions: \bar{p}_{H_2} = 59 bar, \bar{p}_{Ar} = 3.9 bar and $\dot{V}_{H_2}/\dot{V}_{Feed}$ =1042 Nm³ m⁻³.

Note: Measuring point of Lump 1 in Figure S3c for a space time of 2.86 h cm³_{Cat} cm⁻³_{Cat} is probably too low due to measurement uncertainties in distillation.

Table S1. Experimental data (weight fractions) at 340 °C, 350 °C, 370 °C, 380 °C and 390 °C for the co-HP of 15 wt.% durene and 85 wt.% MD. Experimental conditions: \bar{p}_{H_2} = 59 bar, \bar{p}_{Ar} = 3.9 bar and $\dot{V}_{H_2}/\dot{V}_{Feed}$ =1042 Nm³ m⁻³.

T [°C]	Lump	Space time [h ⁻¹]				
		0	0.833	1.333	2.000	4.000
340	6	0.00	1.01	2.39	3.12	4.00
	5	0.00	0.49	0.88	1.30	2.92
	4	5.61	11.46	12.33	19.70	21.31
	3	61.64	55.58	53.71	46.07	42.22
	2	21.51	21.12	20.23	21.44	20.59
	1	11.25	10.33	10.46	8.36	8.97
T [°C]	Lump	Space time [h ⁻¹]				
		0.000	0.666	1.000	1.690	2.860
350	6	0.00	1.04	1.39	2.44	4.84
	5	0.00	0.43	0.73	1.53	3.63
	4	5.61	10.94	12.67	14.37	20.35
	3	61.64	56.58	54.41	51.92	45.02
	2	21.51	20.92	20.90	20.48	19.77
	1	11.25	10.09	9.89	9.27	6.39
370	6	0.00	1.66	1.55	2.19	3.64
	5	0.00	1.13	1.91	3.29	7.92
	4	5.61	13.16	14.54	17.05	20.85
	3	61.64	54.27	52.84	50.81	43.54
	2	21.51	20.00	19.77	18.15	17.70
	1	11.25	9.78	9.39	8.50	6.36
380	6	0.00	2.08	1.73	3.14	5.35
	5	0.00	2.00	2.97	5.48	11.24
	4	5.61	14.50	16.15	18.04	19.70
	3	61.64	53.25	52.30	49.86	45.04
	2	21.51	19.15	18.23	16.06	14.25
	1	11.25	9.01	8.62	7.43	4.44
390	6	0.00	0.99	2.32	4.70	5.29
	5	0.00	3.16	5.29	9.67	18.56
	4	5.61	16.15	19.30	18.32	20.03
	3	61.64	53.00	48.98	47.50	45.87
	2	21.51	18.40	16.82	14.07	10.25
	1	11.25	8.31	7.29	5.74	0.00