

Supporting information

Calculation of mass balances and selectivities

The mass balances were calculated according to a conventional definition, comparing the total mass detected after the reaction with the total mass of the reactants:

$$MB = \frac{\sum_{j=0}^p m_j}{\sum_{i=0}^r m_i} \cdot 100$$

where $\sum_{j=0}^p m_j$ is the total mass of reactants and products detected by GC-FID

analyses after the reaction and $\sum_{i=0}^r m_i$ is the total mass of starting reactants, which is weighed before the reaction.

The masses after reaction were calculated as accurately as possible from the GC-FID analyses. We used an internal standard for the analyses (1,2,3,4-tetrahydronaphthalene), so the area of the peaks could be converted into mass irrespectively of the amount of sample injected (manually) in that particular run. Besides, after injecting known amounts of each of the main compounds, we calculated response factors for those. For the internal standard and for any minority or unknown compound a response factor of 1 was applied.

Each m_j value was calculated as follows:

$$m_j = \frac{A_j \cdot R}{F_j}$$

where A_j is the chromatographic area of the corresponding peak and F_j is the response factor of the specific compound and R is the mass/area ratio of the internal standard in that specific analysis.

The compounds measured in the GC-FID analyses are shown in Table S.1.

Table S.1. Compounds measured for the calculation of mass by GC-FID analysis.

Compound	Compound
Benzene	Methyl isobutyl ketone
Cyclohexane	Internal standard
Cyclohexene	Phenol
Acetone	Diisopropylphenols
2-propanol	Cyclohexylphenols

On the other hand, the GC-MS analyses pointed out that the observed broad peaks of diisopropylphenols and cyclohexylphenols (the only ones visible at higher retention times) in the GC-FID analyses were indeed a mixture of different phenolics that could not be properly separated and identified in the GC-FID analyses. Consequently, the corresponding selectivities towards phenolics was calculated based on the GC-MS distribution, assuming a response factor of 1.

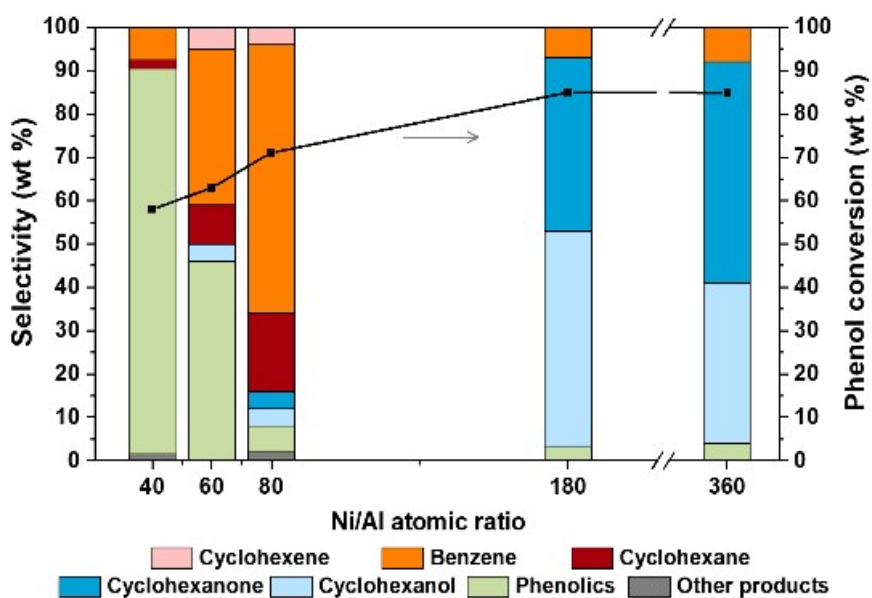


Figure S1. Conversion of phenol and product distribution attained in the reactions with the tandem system Raney Ni plus com-Beta-1 varying the Ni/Al atomic ratio (T = 150 °C; t = 240 min; molar ratio isopropyl alcohol / phenol = 1.5; catalyst: com-Beta-1 (Si/Al = 12.5; $S_{\text{BET}} = 625 \text{ m}^2 \text{ g}^{-1}$).

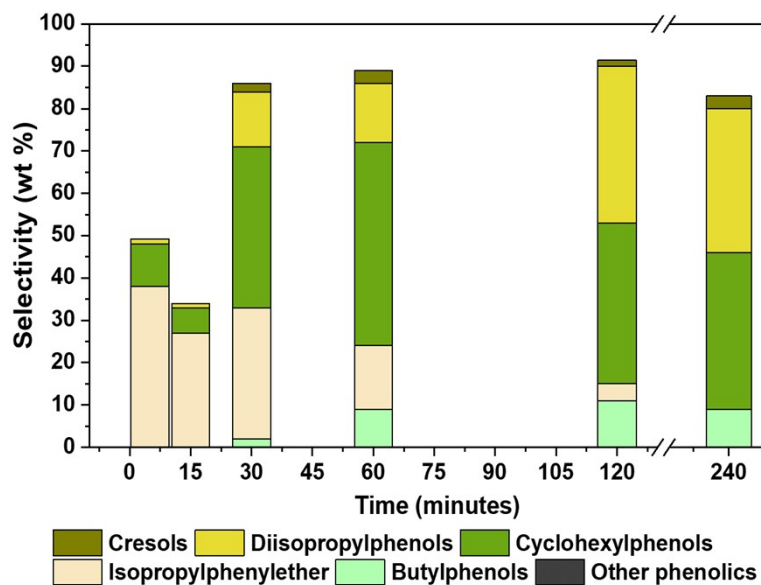


Figure S2. Effect of the reaction time on the phenolics share over the tandem system Raney Nickel plus com-Beta-2 ($T = 150^{\circ} \text{C}$; molar ratio isopropyl alcohol/phenol = 1.5; catalyst: com-Beta-2 ($\text{Si/Al} = 19$; $S_{\text{BET}} = 633 \text{ m}^2 \text{ g}^{-1}$).

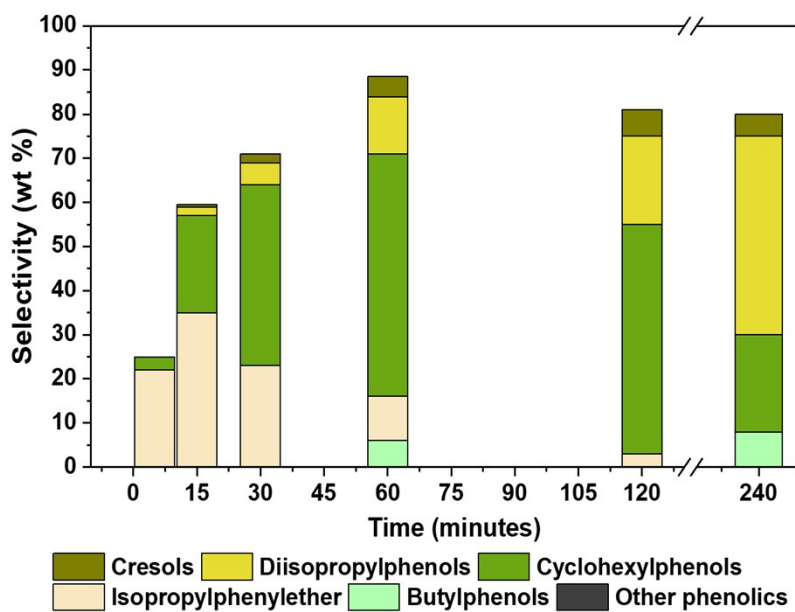


Figure S3. Effect of the reaction time on the phenolics share over the tandem system Raney Nickel plus hierarchical Beta ($\text{Si/Al} = 15$, $S_{\text{BET}} = 711 \text{ m}^2 \text{ g}^{-1}$) ($T = 150^\circ \text{ C}$; molar ratio isopropyl alcohol/phenol = 1.5).