Electronic Supplementary Material (ESI) for RSC Advances.


## Supplementary Information

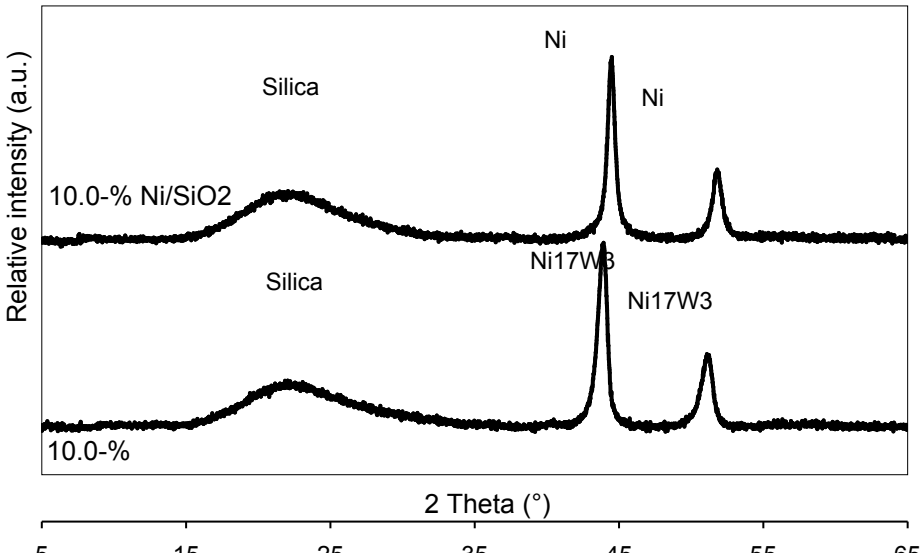


*Figure S1: X-ray diffractograms of $Ni/SiO_2$ and $Ni_{17}W_3/SiO_2$ catalysts. Both catalysts are loaded with 10 wt.-% metal.*

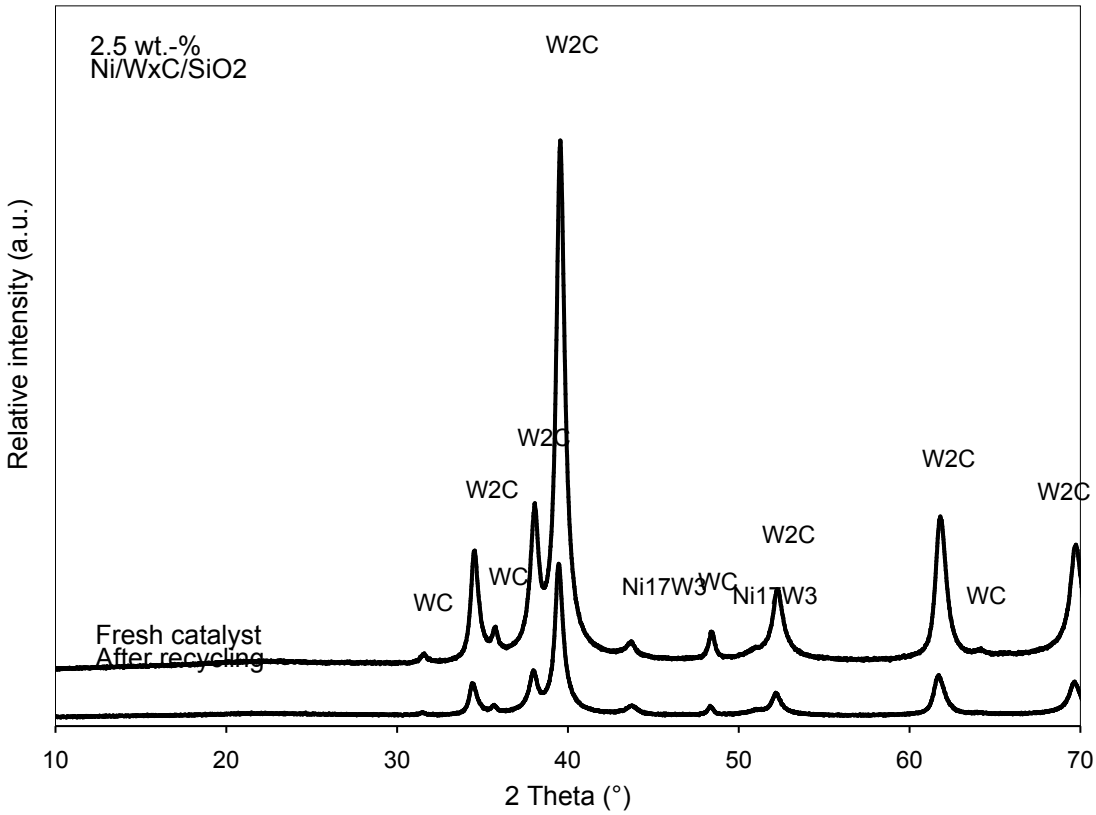


*Figure S2: X-ray diffractograms of the 2.5 wt.-% $Ni/W_xC/SiO_2$ catalysts directly after synthesis and after the recycling catalysis tests with a total of 26 h under reaction conditions.*

*Table S1: Textural properties of catalysts as determined by isothermal nitrogen adsorption (BET method).*

| Entry | Catalyst | Surface area ($m^2/g$) | Pore volume (mL/g) | Pore radius (nm) |
|---|---|---|---|---|
| 1 | $W_xC/SiO_2$ | 96,84 | 0,52 | 1,69 |
| 2 | 0.5 %-Ni/$W_xC/SiO_2$ | 81,66 | 0,42 | 1,69 |
| 3 | 1.0 %-Ni/$W_xC/SiO_2$ | 77,26 | 0,44 | 1,70 |
| 4 | 2.5 %-Ni/$W_xC/SiO_2$ | 75,66 | 0,45 | 1,68 |
| 5 | 4.0 %-Ni/$W_xC/SiO_2$ | 73,85 | 0,45 | 1,68 |
| 6 | 9.0 %-Ni/$W_xC/SiO_2$ | 70,38 | 0,48 | 1,68 |
| 7 | 10.0 %-Ni/$SiO_2$ | 151,47 | 1,24 | 1,69 |
| 8 | 10.0 %-$Ni_{17}W_3/SiO_2$ | 149,18 | 1,29 | 1,69 |
| 9 | 2.5 %-Ni/$W_xC/SiO_2$ after recycling | 83,79 | 0,55 | 1,69 |

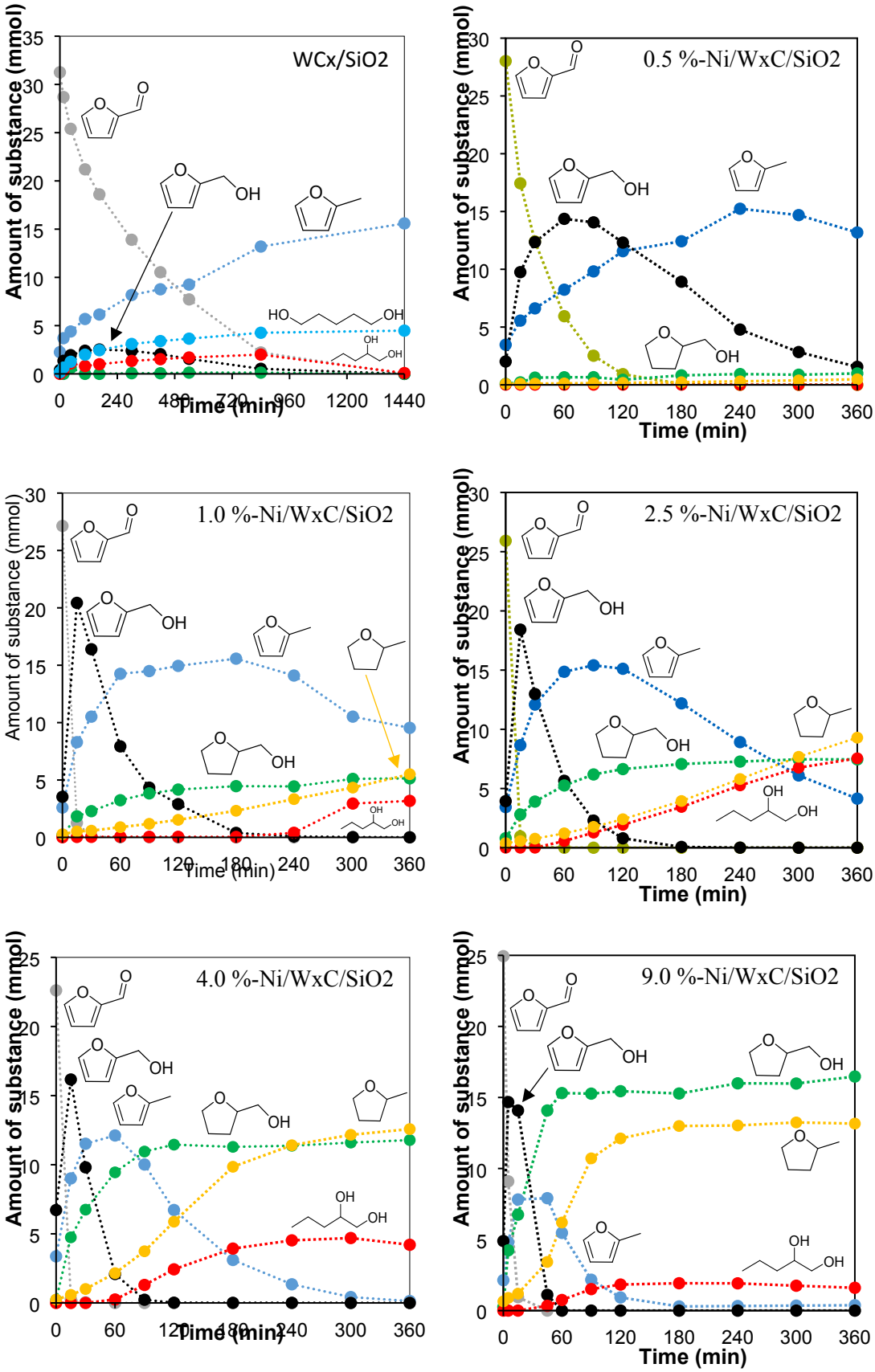


*Figure S3: Reaction progress during catalytic conversion of furfural for tungsten carbide catalysts with differing nickel loadings from 0.0 to 9.0 wt.-% in the catalyst precursor. The reaction proceeds at 200 °C under 65 bar $H_2$, with 0.50 g catalyst and 3 mL furfural in isopropyl alcohol as solvent. The total reaction time for $W_xC/SiO_2$ (without Ni) is 24 h, else it is 6 h.*

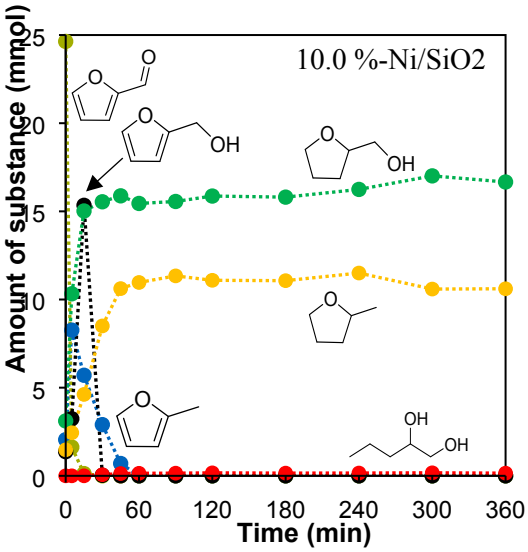


*Figure S4: Reaction progress during catalytic conversion of furfural over a Ni/$SiO_2$ catalyst. The reaction proceeds at 200 °C under 65 bar $H_2$, with 0.50 g catalyst and 3 mL furfural in isopropyl alcohol as solvent.*

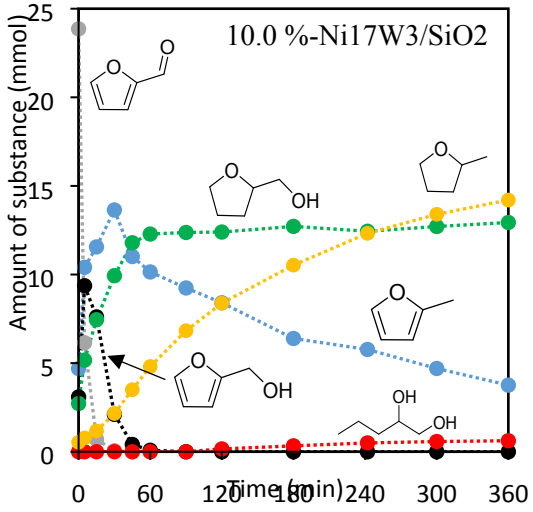


*Figure S5: Reaction progress during catalytic conversion of furfural over a $Ni_{17}W_3$/$SiO_2$ catalyst. The reaction proceeds at 200 °C under 65 bar $H_2$, with 0.50 g catalyst and 3 mL furfural in isopropyl alcohol as solvent.*

Formulas for the calculation of conversion, yield and selectivity.

$$Conversion = 1 - \frac{n_{(Furfural,\,out)}}{n_{(Furfural,\,in)}}$$

$$Yield_{(Product)} = \frac{n_{(Product,\,out)}}{n_{(Furfural,\,in)}}$$

$$Selectivity_{(Product)} = Conversion \times Yield_{(Product)}$$