

Table S1 Fermentation parameters by adding MV

| Time (h)       |                | 0          | 12         | 24         | 36         | 48         |
|----------------|----------------|------------|------------|------------|------------|------------|
| 0 mg/L<br>MV   | Glucose (g/L)  | 40.47±0.02 | 17.70±0.16 | 0.294±0.01 | 0.256±0.01 | 0.00±0.00  |
|                | Formate (mg/L) | 0.00±0.00  | 5.33±1.15  | 13.33±0.58 | 29.00±1.14 | 28.67±0.71 |
|                | Ethanol (g/L)  | 0.00±0.00  | 8.94±0.08  | 15.56±0.17 | 14.91±0.7  | 13.84±0.25 |
| 0.1 mg/L<br>MV | Glucose (g/L)  | 42.61±0.26 | 17.02±0.03 | 0.68±0.08  | 0.31±0.00  | 0.00±0.00  |
|                | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 11.33±0.58 | 28.67±0.58 | 27.67±0.58 |
|                | Ethanol (g/L)  | 0.00±0.00  | 10.08±0.24 | 15.72±0.05 | 15.31±0.11 | 14.02±0.29 |
| 1 mg/L<br>MV   | Glucose (g/L)  | 42.47±0.07 | 17.03±0.20 | 0.988±0.12 | 0.31±0.01  | 0.00±0.00  |
|                | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 11.33±0.58 | 28.67±0.29 | 27.67±0.58 |
|                | Ethanol (g/L)  | 0.00±0.00  | 10.13±0.04 | 15.47±0.02 | 14.90±0.05 | 13.84±0.21 |

Table S2 Fermentation parameters by adding HCO<sub>3</sub><sup>-</sup>

| Time (h)                    |                | 0          | 12         | 24         | 36         | 48         |
|-----------------------------|----------------|------------|------------|------------|------------|------------|
| 0 g/L<br>NaHCO <sub>3</sub> | Glucose (g/L)  | 41.13±2.4  | 10.73±2.22 | 0.297±0.04 | 0.256±0.01 | 0.00±0.00  |
|                             | Formate (mg/L) | 0.00±0.00  | 1.33±1.15  | 16.67±0.58 | 29.00±1.14 | 28.33±0.58 |
|                             | Ethanol (g/L)  | 0.00±0.00  | 13.03±1.16 | 15.63±1.97 | 15.42±0.35 | 14.81±0.25 |
| 2 g/L<br>NaHCO <sub>3</sub> | Glucose (g/L)  | 44.17±2.16 | 11.63±3.11 | 1.28±1.28  | 0.25±0.13  | 0.00±0.00  |
|                             | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  | 9.00±1.00  | 9.00±1.00  |
|                             | Ethanol (g/L)  | 0.00±0.00  | 13.50±0.11 | 15.29±2.25 | 14.56±2.17 | 13.78±2.17 |

Table S3 Fermentation parameters in 40 g/L by adding ZIF-8

|                    | Time (h)       | 0          | 10         | 14         | 18         | 24         | 36         | 48         |
|--------------------|----------------|------------|------------|------------|------------|------------|------------|------------|
| 0 g/L<br>ZIF-8     | Glucose (g/L)  | 35.91±3.8  | 19.95±2.56 | 15.65±2.31 | 10.23±0.31 | 0.69±0.01  | 0.37±0.016 | 0.00±0.00  |
|                    | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  | 2.33±0.58  | 5.33±0.58  | 25.0±1.00  | 24.67±0.58 |
|                    | Ethanol (g/L)  | 0.00±0.00  | 6.53±0.54  | 8.11±0.52  | 10.22±0.06 | 13.33±2.18 | 13.47±2.04 | 13.33±1.44 |
| 0.015 g/L<br>ZIF-8 | Glucose (g/L)  | 37.44±2.11 | 16.93±1.89 | 14.45±1.14 | 9.28±1.02  | 0.45±0.21  | 0.00±0.00  | 0.00±0.00  |
|                    | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  | 4.00±1.00  | 5.00±1.53  | 22.00±2.00 | 23.67±1.15 |
|                    | Ethanol (g/L)  | 0.00±0.00  | 7.29±0.67  | 8.91±0.51  | 9.93±0.55  | 13.69±0.92 | 15.07±0.21 | 14.24±0.21 |
| 0.03 g/L<br>ZIF-8  | Glucose (g/L)  | 37.17±1.68 | 19.39±1.78 | 15.37±1.57 | 10.23±0.12 | 0.80±0.09  | 0.65±0.08  | 0.08±0.07  |
|                    | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  | 5.67±0.58  | 11.33±0.58 | 24.00±1.00 | 23.33±1.15 |
|                    | Ethanol (g/L)  | 0.00±0.00  | 6.96±0.56  | 7.94±0.31  | 10.35±0.25 | 13.59±1.33 | 13.64±1.27 | 13.09±0.79 |
| 0.06 g/L<br>ZIF-8  | Glucose (g/L)  | 38.01±1.37 | 17.79±2.21 | 14.98±1.04 | 9.31±0.42  | 0.59±0.23  | 0.00±0.00  | 0.00±0.00  |
|                    | Formate (mg/L) | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  | 5.33±0.58  | 11.67±0.57 | 24.33±0.57 | 23.00±1.00 |
|                    | Ethanol (g/L)  | 0.00±0.00  | 6.55±0.81  | 8.13±0.89  | 9.82±0.85  | 13.72±1.70 | 14.47±1.01 | 13.83±0.78 |

Table S4 Fermentation parameters in 60 g/L by adding ZIF-8

| Time (h)          |                | 0          | 12         | 24         | 36         | 48         | 60         |
|-------------------|----------------|------------|------------|------------|------------|------------|------------|
| 0.03 g/L<br>ZIF-8 | Glucose (g/L)  | 59.79±0.04 | 26.09±0.17 | 12.28±0.81 | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  |
|                   | Formate (mg/L) | 0.00±0.00  | 9.33±0.58  | 43.33±1.53 | 57.33±1.54 | 60.67±2.08 | 45.00±0.58 |
|                   | Ethanol (g/L)  | 0.00±0.00  | 12.90±0.13 | 17.74±0.20 | 21.78±0.45 | 21.81±0.23 | 18.90±0.23 |
| 0.06 g/L<br>ZIF-8 | Glucose (g/L)  | 59.09±0.29 | 26.79±1.28 | 11.58±1.42 | 0.00±0.00  | 0.00±0.00  | 0.00±0.00  |
|                   | Formate (mg/L) | 0.00±0.00  | 11.00±1.00 | 43.67±0.58 | 58.67±0.58 | 62.00±2.00 | 45.67±1.15 |
|                   | Ethanol (g/L)  | 0.00±0.00  | 12.81±0.16 | 17.70±0.42 | 21.64±0.93 | 21.84±0.27 | 18.84±0.39 |