Supplementary Material

Kinetic energy dose as a unified metric for comparing ball mills in the mechanocatalytic depolymerization of lignocellulose

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Table S1: Milling conditions for experiments carried out in the planetary mill Pulverisette 7 premium line equipped with 80 mL grinding jars containing 6.4 g H2SO4-impregnated beechwood per jar.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entry | Ball diameter(mm) | Ball count per jar (unit)  | Rotational speed(rpm) | Milling time (h) |
| 1 | 4 | 391 | 400 | 1.5 |
| 2 | 4 | 391 | 500 | 1.5 |
| 3 | 4 | 391 | 600 | 1.5 |
| 4 | 4 | 391 | 800 | 1.5 |
| 5 | 5 | 201 | 500 | 4 |
| 6 | 5 | 201 | 500 | 8 |
| 7 | 5 | 201 | 600 | 4 |
| 8 | 5 | 261 | 600 | 1.5 |
| 9 | 10 | 33 | 600 | 1.5 |
| 10 | 10 | 34 | 500 | 0.5 |
| 11 | 10 | 34 | 500 | 1.17 |
| 12 | 10 | 34 | 500 | 3.75 |
| 13 | 10 | 34 | 600 | 1.73 |
| 14 | 10 | 26 | 500 | 1.5 |
| 15 | 10 | 26 | 500 | 0.5 |
| 16 | 10 | 26 | 500 | 3 |
| 17 | 10 | 26 | 400 | 1.5 |
| 18 | 10 | 26 | 500 | 4.4 |
| 19 | 10 | 26 | 500 | 2.5 |
| 20 | 10 | 26 | 500 | 0.18 |
| 21 | 15 | 10 | 600 | 1.5 |
| 22 | 20 | 4 | 600 | 1.5 |

Table S2. Milling conditions for experiments carried out in the high-energy Emax mill equipped with 50 mL grinding jars containing 4 g H2SO4-impregnated beechwood per jar.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entry | Ball diameter (mm) | Ball count per jar (unit) | Rotational speed (rpm) | Milling time(h) |
| 1 | 2 | 2061 | 1500 | 3 |
| 2 | 3 | 611 | 1500 | 3 |
| 3 | 4 | 250 | 1500 | 3 |
| 4 | 5 | 128 | 1500 | 3 |
| 5 | 5 | 128 | 1300 | 3 |
| 6 | 6 | 74 | 1500 | 3 |
| 7 | 7 | 46 | 1500 | 3 |
| 8 | 8 | 31 | 1500 | 3 |
| 9 | 9 | 21 | 1500 | 3 |
| 10 | 10 | 16 | 1500 | 3 |
| 11 | 10 | 16 | 1500 | 2 |
| 12 | 10 | 16 | 1500 | 1 |
| 13 | 10 | 16 | 800 | 3 |
| 14 | 10 | 16 | 800 | 2 |
| 15 | 10 | 16 | 800 | 1 |
| 16 | 10 | 16 | 1200 | 3 |
| 17 | 10 | 16 | 1200 | 2 |
| 18 | 10 | 16 | 1200 | 1 |
| 19 | 10 | 16 | 1200 | 0.3 |



Figure S1. Internal dimensions of the grinding jars of the planetary mill (Pulverisette 7 premium line, 80 mL jar) and the high-energy Emax mill (50 mL jar). Blue lines indicate the paths of friction.