

## Efficient conversion of cotton stalk over Fe modified HZSM-5 catalyst under microwave irradiation

Xiangjin Kong\*, Xiaole Li, Shuxiang Wu, Xin Zhang, Junhai Liu\*

Shandong Provincial Key Laboratory of Chemical Energy Storage and Novel Cell Technology, School of Chemistry and Chemical Engineering, Liaocheng University, Liaocheng 252059, China.

Corresponding author's E-mail: kongxjin@163.com.

**Table S1** Components of the sample over HZSM-5 by conventional reaction

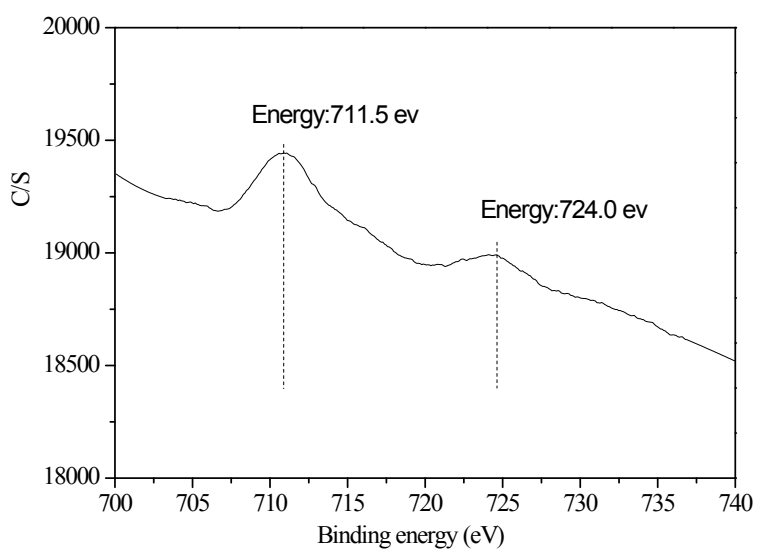
Compound	Formula	Area (%)
Benzonitrile	C <sub>7</sub> H <sub>5</sub> N	2.30
1-paopanone	C <sub>9</sub> H <sub>10</sub> O	5.86
Thiomorpholine	C <sub>4</sub> H <sub>9</sub> NS	1.89
Cyclohexaneethanol	C <sub>8</sub> H <sub>16</sub> O	1.01
8-Heptadecene	C <sub>17</sub> H <sub>34</sub>	2.10
Hexadecanoic acid, methyl ester	C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>	1.82
2-(Pro-2-enoyloxy) tridecane	C <sub>16</sub> H <sub>30</sub> O <sub>2</sub>	2.93
9,12-Octadecadienoic acid, methyl	C <sub>19</sub> H <sub>34</sub> O <sub>2</sub>	3.37
Oleic Acid	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>	33.07
1-Hexyl-1-nitrocyclohexane	C <sub>12</sub> H <sub>23</sub> NO <sub>2</sub>	6.13
9-Octadecenoic acid (Z)-, methyl ester	C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>	14.05
1-Cyano-4-(5-hexenyl)benzene	C <sub>13</sub> H <sub>15</sub> N	6.14
E-2-Octadecadecen-1-ol	C <sub>18</sub> H <sub>36</sub> O	3.33
Pentadec-7-ene, 7-bromomethyl-	C <sub>16</sub> H <sub>31</sub> Br	3.22
2-(3-Hydroxybutyl)cyclooctanone	C <sub>12</sub> H <sub>22</sub> O <sub>2</sub>	1.65

**Table S2** Components of the sample over HZSM-5 by microwave irradiation

Compound	Formula	Area (%)
Ethane	C <sub>2</sub> H <sub>6</sub>	1.31
Ketene	C <sub>2</sub> H <sub>2</sub> O	2.08
Benzonitrile	C <sub>7</sub> H <sub>5</sub> N	5.62
1,3-Benzodioxole, 5-(2-nitro-1-pro penyl)-	C <sub>10</sub> H <sub>9</sub> NO <sub>4</sub>	2.91
Propanoic acid	C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>	10.06
o-Xylene	C <sub>8</sub> H <sub>10</sub>	13.01
Ethanamine, N-ethyl-	C <sub>4</sub> H <sub>11</sub> N	1.48
m-Methoxybenzonitrile	C <sub>8</sub> H <sub>7</sub> NO	1.37
2-Pentynal semicarbazone	C <sub>6</sub> H <sub>9</sub> N <sub>3</sub> O	1.06
Benzoic acid, ethyl ester	C <sub>9</sub> H <sub>10</sub> O <sub>2</sub>	8.17
Homopierazine	C <sub>5</sub> H <sub>12</sub> N <sub>2</sub>	1.39
1-Hexene	C <sub>6</sub> H <sub>12</sub>	2.11
1,3-Dioxolane-2-propanoic acid, 2-	C <sub>9</sub> H <sub>16</sub> O	1.83
4-Ethoxybenzal doxime	C <sub>9</sub> H <sub>11</sub> NO <sub>2</sub>	1.26
Benzene,(1-methyldodecyl)- (1-methyldodecyl)- (1-methyldodecyl)- (1-methyldodecyl)-	C <sub>19</sub> H <sub>32</sub>	1.70
Hexadecanoic acid, methyl eester		1.06
Pentadecanal-	C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>	1.76
7-Octadecenoic acid, methyl ester		6.30
9,12-Octadecadienoic acid, methyl ester	C <sub>19</sub> H <sub>34</sub> O <sub>2</sub>	3.31
11-Octadecenoic acid, methyl ester	C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>	4.64
Bis(2-ethylhexyl) phthalate	C <sub>24</sub> H <sub>38</sub> O <sub>4</sub>	8.29

**Table S3** Components of the sample over 0.02-Fe-HZSM-5 by microwave irradiation

Compound	Formula	Area (%)
Ketene	C <sub>2</sub> H <sub>2</sub> O	4.92
Ethane	C <sub>2</sub> H <sub>6</sub>	2.50
Mthy 3-hydroxytetradecanote	C <sub>15</sub> H <sub>30</sub> O <sub>3</sub>	3.94
Propanoic acid	C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>	2.04
Ethanamine, 2-propoxy-	C <sub>5</sub> H <sub>13</sub> NO	1.85
Benzene, (2-isothiocyanatoethyl)-	C <sub>9</sub> H <sub>9</sub> NS	1.76
Benzene, (1-methyldodecyl)-	C <sub>19</sub> H <sub>32</sub>	2.61
Hexadecanoic acid, methyl ester	C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>	3.17
7-Octadecenoic acid, methyl ester	C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>	20.43
9,17-Octadecadienal, (Z)-	C <sub>18</sub> H <sub>32</sub> O	4.52
Octadecanoic acid, methyl ester	C <sub>19</sub> H <sub>38</sub> O <sub>2</sub>	1.43
9,12-Octadecadienoic acid (Z,Z)-,methyl ester	C <sub>19</sub> H <sub>34</sub> O <sub>2</sub>	4.53
2-Ethylacridine	C <sub>15</sub> H <sub>13</sub> N	4.03
Bis (2-ethylhexyl) phthalate	C <sub>24</sub> H <sub>38</sub> O <sub>4</sub>	25.74

**Fig. S1** XPS spectra of Fe 2p on 0.02-Fe-HZSM-5

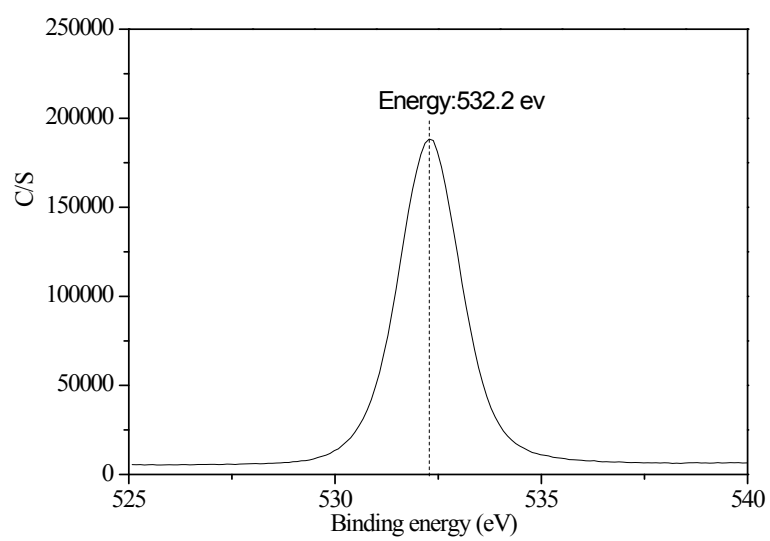


Fig. S2 XPS spectra of O 1s on 0.02-Fe-HZSM-5

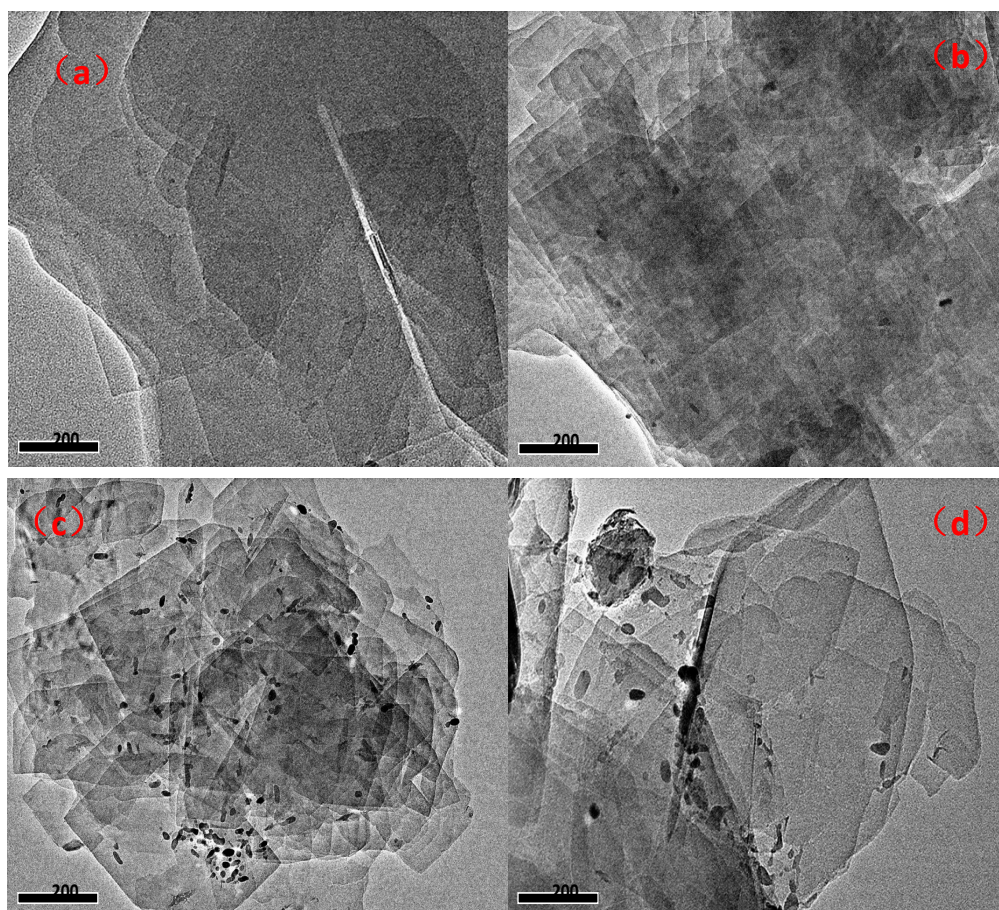


Fig. S3 (a) HZSM-5, (b) 0.01-Fe-HZSM-5, (c) 0.02-Fe-HZSM-5, (d) 0.04-Fe-HZSM-5