Utilization of waste straw biomass in suspension magnetization roasting of refractory iron ore: iron recovery, gas analysis and roasted products characterization

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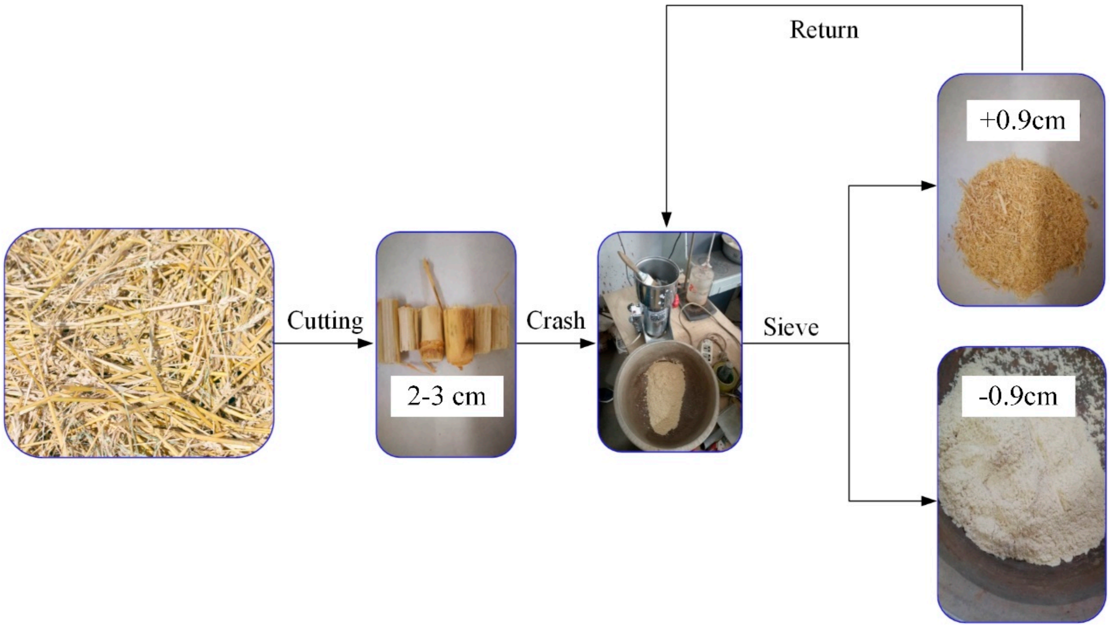
Captions

Figure S1. Preparation process of straw powder.

Figure S2. The general ion diagrams of straw-type and hematite ores mixture at different characteristic temperature: (a) 329 °C, and (b) 820 °C.

Table S1. Peak areas of evolved compounds at 329 °C in SMR process by GC/MS.

Table S2. Peak areas of evolved compounds at 820 °C in SMR process by GC/MS.



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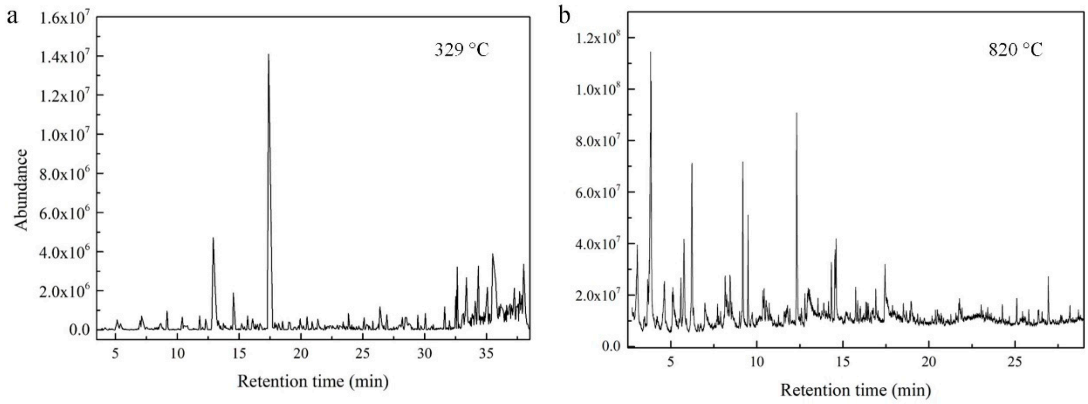

Figure S2. The general ion diagrams of straw-type and hematite ores mixture at different characteristic temperature: (a) 329 °C, and (b) 820 °C.

Table S1. Peak areas of evolved compounds at 329 °C in SMR process by GC/MS.

Retention time (min)	Molecular formula	Compounds	Relative content (%)
12.899	C_8H_8O	4-methylbenzaldehyde	2.73
13.059	C_8H_8O	Vinyl phenyl ether	1.22
14.534	$C_9H_{10}O_2$	2-methyl-4-hydroxyacetophenone	1.10
17.375	$C_6H_{10}O_5$	1,6-anhydro-β-D-glucose	8.16
26.389	$C_{15}H_{24}O_2$	3,5-di-tert-butyle-4-hydroxyanisole	0.68
31.621	$C_{17}H_{30}OSi$	Trimethyl [4-(1,1,3,3-tetramethylbutyl) phenoxy] silane	0.68
32.512	$C_{22}H_{46}$	6,6-diethylhoctadecane	0.99
32.637	$C_{30}H_{50}$	Squaleme	1.86
33.387	$C_6H_{18}O_3Si_3$	Hexamethyl-cyclotrisiloxane	1.55

Table S2. Peak areas of evolved compounds at 820 °C in SMR process by GC/MS.

Retention time (min)	Molecular formula	Compounds	Relative content (%)
3.054	$C_5H_8O_2$	Methyl methacrylate	3.75
3.650	$C_{21}H_{15}O_9NF_{12}$	Tetrakis	0.90
3.825	C_7H_8	Toluene	10.63
4.635	$C_6H_{18}O_3Si_3$	Hexamethyl-cyclotrisiloxane	2.37
5.115	$C_8H_{16}O_2$	CIS-1,2-cyclohexanedimethanol	1.19
5.585	C_8H_{10}	Ethylbenzene	1.10
5.766	C_8H_{10}	P-xylene	3.19
6.226	$C_{15}H_{14}O_2$	Benzoic acid	4.44
6.986	$C_8H_{14}ONF_3$	1-(3,3,3-trifluoro-2-hydroxypropyl) piperrazine	1.30
8.437	C_9H_{10}	2-propenyl-benzene	1.24
9.187	$C_{10}H_{16}$	D-limonene	3.09
9.482	C_9H_8	3-methylphenylacetyleme	1.72
12.313	$C_{10}H_8$	Naphthalene	4.59
13.049	$C_8H_{10}O_2$	1,2-benzenedimethanol	0.94
14.329	$C_{11}H_{10}$	2-methyl-naphthalene	1.28
14.539	$C_9H_{10}O_2$	2-methoxy-4-vinylphenol	1.47
14.604	$C_{11}H_{10}$	1-methyl-naphthalene	1.81
17.445	$C_6H_{10}O_5$	1,6-anhydro-beta-D-glucopyranose	2.10
17.560	$C_6H_{12}O_6$	D-allose	1.28
26.939	$C_{18}H_{18}$	Methyl-1-isopropyl-7-phenanthrene	0.97