Producing Aromatic-Enriched Oil from Mixed Plastics Using Activated Biochar as Catalyst

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Table S1. Main compositions in direct thermal and catalytic pyrolysis oils (based on area %).

Identified compound	Chemical formula	Type of catalysts				
		Model plastics	BC	AC-$ZnCl_2$	AC-KOH	AC-H_3PO_4
Alkanes						
Cyclopropane,1-methyl-2-(3-methylpentyl)-	$C_{10}H_{20}$				0.23	
Cyclohexane, methyl-	$C_{10}H_{20}$		0.91			
Cyclopentane,1-butyl-2-propyl-	$C_{12}H_{24}$		1.84			
Dodecane	$C_{12}H_{26}$				0.23	
Cyclopentane,1-pentryl-2-propyl-	$C_{13}H_{21}$			0.94		
Tridecane	$C_{13}H_{28}$		0.47		1.15	1.23
Tetradecane	$C_{14}H_{30}$	1.19	1.43	1.66	2.60	1.61
Pentadecane	$C_{15}H_{32}$	2.73	2.64	2.38	4.47	2.35
Pentadecane,4-methyl-	$C_{16}H_{34}$		1.18			
Hexadecane	$C_{16}H_{34}$	2.88	2.64	2.47	4.73	2.24
Heptadecane	$C_{17}H_{36}$	3.10	2.70	2.85	6.06	2.91
Heptadecane，2-methyl-	$C_{18}H_{38}$			2.09		
Octadecane	$C_{18}H_{38}$	3.28	2.64	3.73	5.20	5.05
Nonadecane	$C_{19}H_{40}$	2.65	2.55	1.26	4.57	3.77

Hexadecane，2,6,10,14-tetramethyl-	$C_{20}H_{42}$					0.70
Eicosane	$C_{20}H_{42}$	2.35	2.22	2.38	3.26	1.26
Heneicosane	$C_{21}H_{44}$	2.07	2.20	1.96	2.66	
Docosane	$C_{22}H_{46}$	1.77	1.55	2.09	2.99	0.90
Tricosane	$C_{23}H_{48}$				2.25	1.47
Cyclodocosane, ethyl-	$C_{24}H_{48}$		1.94		0.60	
Cyclotetracosane	$C_{24}H_{48}$			0.87		
Tetracosane	$C_{24}H_{50}$				2.15	
Cyclohexane,(1-hexyltetradecyl)-	$C_{26}H_{46}$	1.74		1.46		
Alkenes						
Naphthalene,1,4,5,8-tetrahydro-	$C_{10}H_{12}$		0.83			
1,8-Nonadiene,2,8-dimethyl-	$C_{11}H_{20}$		1.71			
1,12-Tridecadiene	$C_{13}H_{24}$		0.56			
1-Tridecene	$C_{13}H_{26}$		0.75	1.45	0.51	
(Z)-3-Tetradecene	$C_{14}H_{28}$	1.67				
1-Tetradecene	$C_{14}H_{28}$	2.90	3.97	2.24	1.06	1.20
1,2,4,8-Tetramethylbicyclo[6.3.0]undeca-2,4-diene	$C_{15}H_{24}$					1.35
1-Pentadecene	$C_{15}H_{30}$	4.90	5.18	2.76	1.73	1.31

1-Hexadecene	$C_{16}H_{32}$	6.96	6.86	3.23	1.80	1.29
1-Heptadecene	$C_{17}H_{34}$		9.90			
1-Octadecene	$C_{18}H_{36}$	7.01	6.17	4.86	2.86	3.55
1-Nonadecene	$C_{19}H_{38}$	4.46	4.52	3.30	1.43	1.12
1,19-Eicosadiene	$C_{20}H_{38}$		1.89			
1-Eicosene	$C_{20}H_{40}$	3.74	3.89	2.97	1.50	
(E)-3-Eicosene	$C_{20}H_{40}$				0.63	
1-Heneicosene	$C_{21}H_{42}$	3.11	3.55	1.14	0.65	
1-Docosene	$C_{22}H_{44}$	2.50	3.09	1.39		
1-Tricosene	$C_{23}H_{46}$	1.86	2.07	0.72		
Aromatics						
Benzene,3-butenyl-	$C_{10}H_{10}$	11.55	7.46	1.59		1.15
Benzocycloheptatriene	$C_{11}H_{10}$					1.28
Naphthalene,2-ethenyl-	$C_{12}H_{10}$					0.73
Fluorene	$C_{13}H_{10}$				0.52	1.88
Diphenylmethane	$C_{13}H_{12}$					0.61
1,1'-Biphenyl,2-methyl-	$C_{13}H_{12}$					0.82
Benz[a]azulene	$C_{14}H_{10}$					1.30
Phenanthrene	$C_{14}H_{10}$				0.46	

9H-Fluorene,1-methyl-	$C_{14}H_{12}$	1.92	0.74	2.77	0.62	3.56
9H-Fluorene,9-methyl-	$C_{14}H_{12}$				0.69	
Benzene,1,1'-(1,2-ethanediyl)bis-	$C_{14}H_{14}$		0.58			
1H-Indene,2-phenyl-	$C_{15}H_{12}$					5.42
Anthracene,2-methyl-	$C_{15}H_{12}$					2.33
Benzene ， 1-methyl-2-(2-phenylethenyl)-	$C_{15}H_{14}$		1.62			
Benzene,1,1'-cyclopropylidenebis-	$C_{15}H_{14}$	2.35		5.30	2.50	3.92
Benzene,1,1'-(1,3-propanediyl)bis-	$C_{15}H_{16}$	14.73		20.27	25.07	16.15
Benzene, Nonyl-	$C_{15}H_{24}$	1.62		0.64	0.52	
Dibenzo[a,e]cyclooctene	$C_{16}H_{12}$			0.71		2.52
Naphthalene,1-phenyl-	$C_{16}H_{12}$				1.57	
Naphthalene,2-phenyl-	$C_{16}H_{12}$		2.14		0.80	2.50
Benzene,1,1'-(1-buten-3-yne-1,4-diyl)bis-	$C_{16}H_{12}$			0.82		1.83
1H-Indene,2-methyl-3-phenyl-	$C_{16}H_{14}$			0.61	0.31	2.28
Benzene,1,1'-(1-butenylidene)bis-	$C_{16}H_{16}$	3.70	4.42	7.41	5.85	8.39
Benzene,1,1'-(1-methyl-1,3-propanediyl)bis-	$C_{16}H_{18}$			5.74	5.78	6.01
1,3-Pentadiene,1,1-diphenyl-, (Z)-	$C_{17}H_{16}$					0.99
1,1':3',1''-Terphenyl,5'-phenyl-	$C_{24}H_{18}$					2.31

Others					
3-Methylpenta-1,4-diene-3-ol	$C_6H_{10}O$				0.72
4-Heptenal	$C_7H_{12}O$	1.23			
2-n-Butylacrolein	$C_7H_{12}O$			0.47	
Hexanedioic acid,monoethyl ester	$C_8H_{14}O_4$			1.17	
1-Octanol,3,7-dimethyl-,(S)-	$C_{10}H_{22}O$		0.49		
Cyclododecanol,1-ethenyl-	$C_{14}H_{26}O$		0.72		
Cyclobutanecarboxylic acid,2-tridecyl ester-	$C_{18}H_{34}O_2$			0.59	

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