

Supporting Information

Synthesis of Ferrocene-based Saccharides and Their Anti-migration and Burning Rate Catalytic Properties

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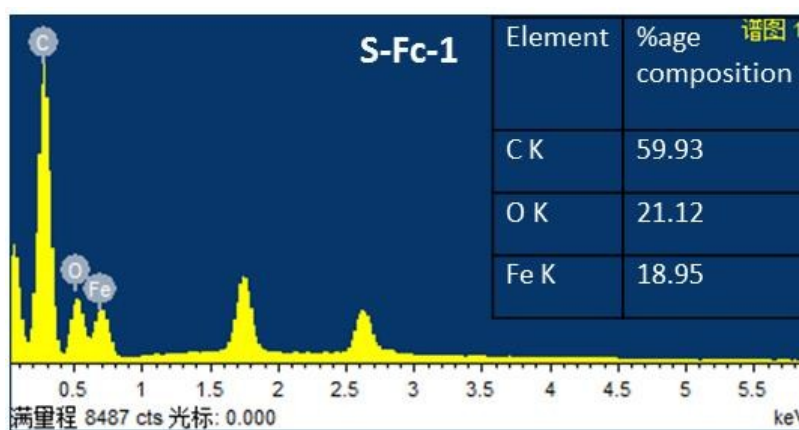
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Table S1. Experimental detail for the synthesis of **S-Fcs**

Sample	Saccharide (A)			Ferrocenecarbonyl chloride (B)			Mole ratio A:B	NaH		THF mL	Time h	Temperature °C
	g	mmol	mol.L ⁻¹	g	mmol	mol.L ⁻¹		g	mmol			
S-Fc-1*	1.2000	6.66	0.09	11.5880	46.63	0.67	1 : 7	0.7996	33.33	70	10	66
S-Fc-2*	1.0000	2.92	0.10	6.5348	26.29	0.53	1 : 9	0.5608	23.37	50	10	66
S-Fc-3*	0.5000	0.99	0.03	2.9562	11.89	0.26	1 : 12	0.2616	10.90	45	10	66
S-Fc-4**	0.2780	1.71	0.06	1.2800	5.14	0.10	1 : 3	0.1233	5.14	50	10	66

*Calculations were done by taking molecular mass of the saccharides

**Calculations were done by taking mass of single repeating unit.



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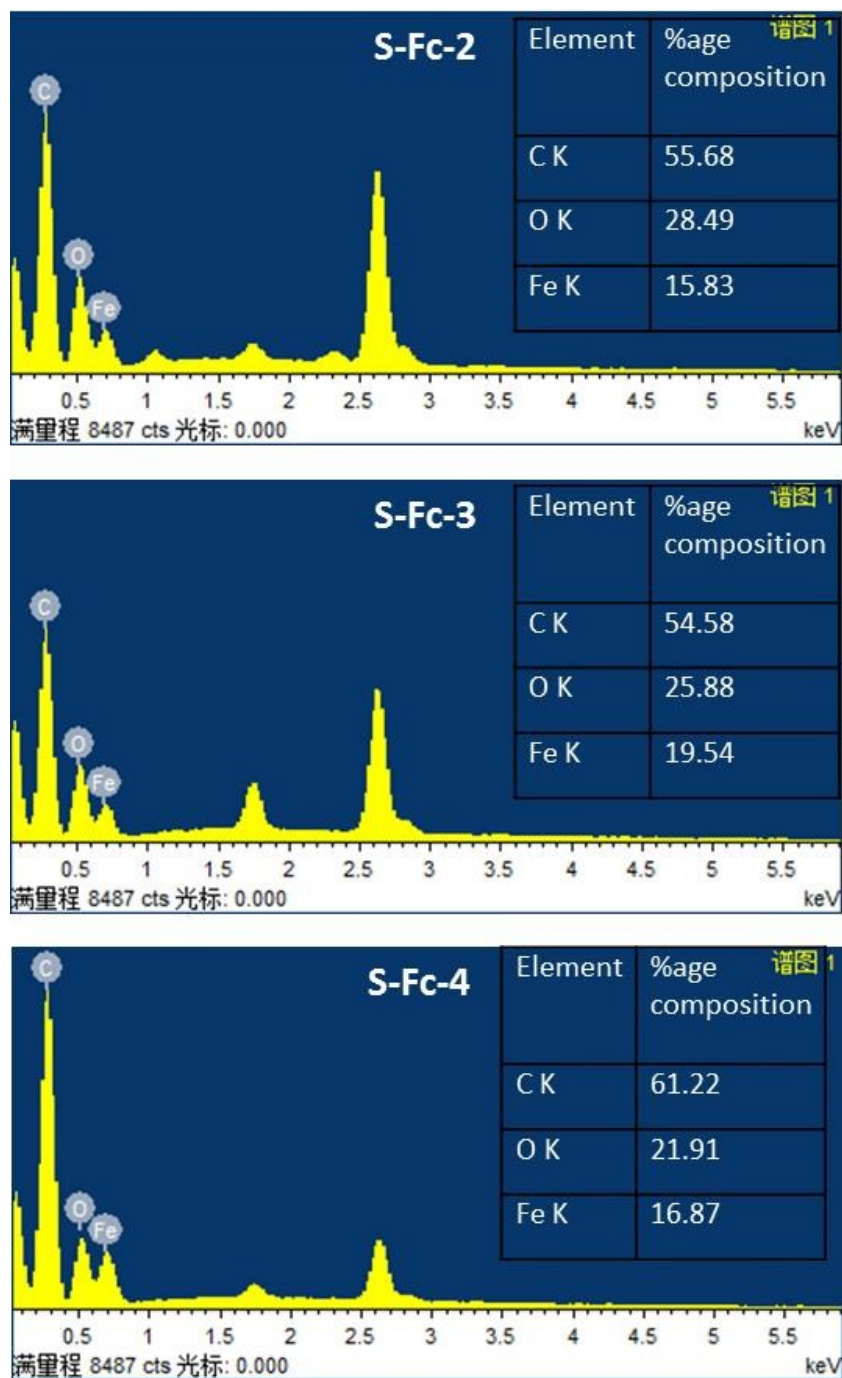


Figure S1. EDX spectra of S-Fcs.

Spectroscopic data of ferrocene-based saccharides (S-Fcs):

Data of **S-Fc-1**: ^1H NMR (600MHz, DMSO): δ ppm, 6.60 (d, 1H, **1**), 6.45 (d, 1H, **5**), 4.75 (m, 10H, **7**), 4.50 (m, 10H, **8**), 4.25 (m, 25H, **9**), 3.75 (t, 1H, **3**), 3.65 (t, 2H, **6**), 3.40 (t, 1H, **2**) and

2.90 (s, 1H, **4**). IR (KBr): cm^{-1} , 2847.57, 1710.81, 1474.66, 1122.64, 825.66 and 504.77. UV-Vis (0.012 mM solution in DCM): nm, 311 (charge transfer band), 264 and 232 (π - π^* transitions).

Data of **S-Fc-2**: ^1H NMR (600MHz, DMSO): δ ppm, 6.60 (d, 2H, **1**), 6.45 (d, 2H, **5**), 4.75 (m, 16H, **7**), 4.50 (m, 16H, **8**), 4.25 (m, 40H, **9**), 3.65 (t, 4H, **6**), 3.50 (m, 4H, **2** and **3**) and 2.98 (m, 2H, **4**). IR (KBr): cm^{-1} , 2854.99, 1725.66, 1466.63, 1275.00, 1122.64, 825.70 and 482.49. UV-Vis (0.012 mM solution in DCM): nm, 312 (charge transfer band), 265 and 232 (π - π^* transitions).

Data of **S-Fc-3**: ^1H NMR (600MHz, DMSO): δ ppm, 6.62 (d, 3H, **1**), 6.48 (d, 3H, **5**), 4.78 (m, 22H, **7**), 4.49 (m, 22H, **8**), 4.24 (m, 55H, **9**), 3.70 (t, 3H, **3**), 3.60 (m, 6H, **6**), 3.40 (m, 3H, **2**) and 2.90 (m, 3H, **4**). IR (KBr): cm^{-1} , 2847.57, 1710.82, 1458.38, 1275.25, 1130.83, 818.24 and 482.49. UV-Vis (0.012 mM solution in DCM): nm, 450 (d-d transitions), 312 (charge transfer band), 263 and 231 (π - π^* transitions).

Data of **S-Fc-4**: ^1H NMR (600MHz, DMSO): δ ppm, 6.65 (d, 1H, **1**), 6.50 (d, 1H, **5**), 4.74 (m, 6H, **7**), 4.49 (m, 6H, **8**), 4.23 (m, 15H, **9**), 3.63 (t, 2H, **6**), 3.42 (m, 2H, **2** and **3**) and 2.96 (m, 1H, **4**). IR (KBr): cm^{-1} , 2847.57, 1710.81, 1474.06, 1283.50, 1107.80, 825.66 and 489.91. UV-Vis (0.012 mM solution in DCM): nm, 453 (d-d transitions), 312 (charge transfer band), 262 and 230 (π - π^* transitions).

Table S2. The detail of samples preparation for UV-Vis absorption studies

Sample	Amount of sample		Solvent	Volume of	Concentration
	mg	mmol		mL	mmol.L ⁻¹
S-Fc-1	0.2	0.00012	DCM	10	0.012
S-Fc-2	0.3	0.00012	DCM	10	0.012
S-Fc-3	0.3	0.00012	DCM	10	0.012
S-Fc-4	0.1	0.00012	DCM	10	0.012

Table S3. The detail of samples preparation for CV studies

Ferrocene-based saccharides	Amount of sample			Amount of electrolyte (Bu ₄ NBF ₄)			*Volume of solution
	mg	mmol	mmol.L ⁻¹	mg	mmol	mmol.L ⁻¹	mL
S-Fc-1	6.2	0.005	0.50	329.3	1.0	100	10
S-Fc-2	10.6	0.005	0.50	329.3	1.0	100	10
S-Fc-3	14.2	0.005	0.50	329.3	1.0	100	10
S-Fc-4	4.2	0.005	0.50	329.3	1.0	100	10

*Solvents used for the preparation of solution were DCM, CHCl₃ and DMSO.

Table S4. The detail of samples preparation for anti-migration studies

Sample	Ammonium perchlorate		Burning rate catalyst		Hydroxyl terminated polybutadiene		Isophorone diisocyanate	
	g	Wt. %	g	Wt.	g	Wt. %	g	Wt. %
S-Fc-1	1.9149	69.08	0.0820	2.95	0.5820	20.99	0.1930	6.96
S-Fc-2	1.9238	70.97	0.0885	3.26	0.5302	16.56	0.1680	6.20
S-Fc-3	1.9551	71.64	0.0792	2.90	0.5215	19.11	0.1731	6.34
S-Fc-4	1.9923	71.32	0.0821	2.94	0.5210	18.65	0.1980	7.05
Ferrocene	1.9400	70.11	0.0820	2.96	0.5650	20.41	0.1801	6.50
Catocene	1.9152	70.34	0.0899	3.30	0.5465	20.07	0.1711	6.28
Blank	21.1605	71.93	-	-	6.2619	21.28	1.9971	6.79

Table S5. The detail of samples preparation for TG and DTG analysis

Sample	Sample Code	S-Fcs	AP	Total amount	Wt.% of S-Fcs	Sample used
1	AP+ 5 Wt.% S-Fc-1	1.5	28.5	30.0	5.0	3.2
2	AP+ 5 Wt.% S-Fc-2	1.5	28.5	30.0	5.0	2.8
3	AP+ 5 Wt.% S-Fc-3	1.5	28.5	30.0	5.0	3.6
4	AP+ 5 Wt.% S-Fc-4	1.0	19.0	20.0	5.0	3.7

5	AP + 1 Wt.% S-Fc-4	0.3	29.7	30.0	1.0	3.1
6	AP + 2 Wt.% S-Fc-4	0.6	29.4	30.0	2.0	2.9
7	AP + 3 Wt.% S-Fc-4	0.9	29.1	30.0	3.0	2.9
8	AP + 4 Wt.% S-Fc-4	1.2	28.8	30.0	4.0	2.8
