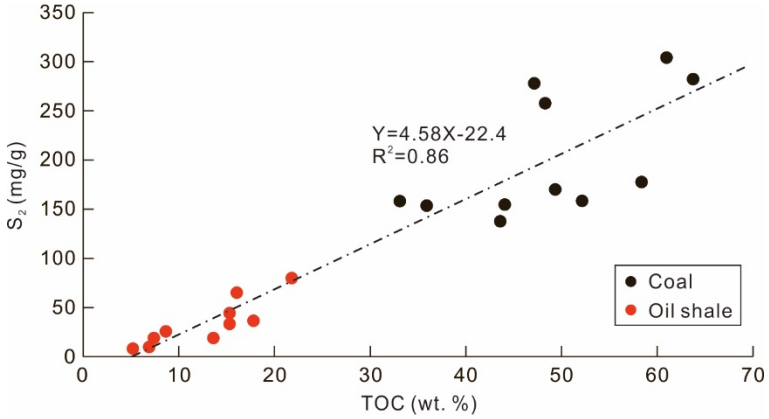
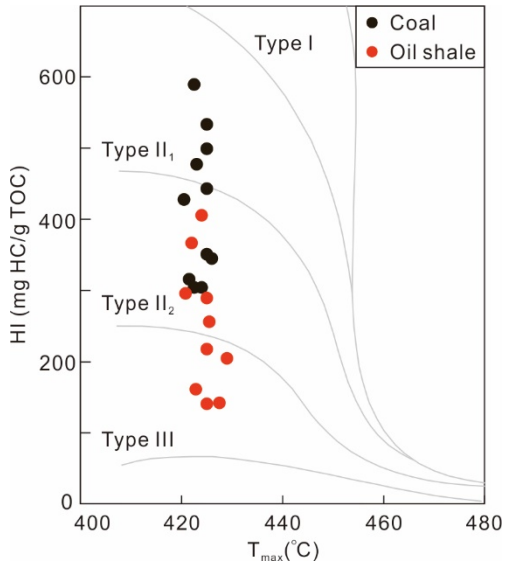


Supplementary Figure S1. Cross-plot of total organic carbon (TOC) versus the hydrocarbon generated from kerogen (S_2) of oil shale and coal samples.



Supplementary Figure S2. Cross-plot of the temperature of maximum generation (Tmax) versus hydrogen index (HI) of oil shale and coal samples.

Supplementary Table S1. Ash yield, bulk geochemistry, maceral composition, and vitrinite reflectance (Ro) of the studied oil shale and coal.

Sample	Depth	Lithology	Ash yield	TOC	S	S_2	HI	Tmax	Vitrnite	Liptinite	Inertinte	Sporinite	Resinite	Cutinite	Fluorinite	Others *	Ro
No.	m		wt. %	wt.%	wt.%	mg/g	mg/g TOC	℃	vol. %, mmf +								%
L21	162.0	Oil shale	50.7	15.3	0.06	33.3	218	425	92.0	7.8	0.2	0.8	5.9	0.6		0.5	
L20	172.9	Oil shale	46.6	16.1	0.22	65.1	406	424	67.3	32.3	0.4	17.8	13.1	0.8	0.2	0.4	
L19	200.1	Oil shale	55.3	8.7	0.08	25.6	296	421	84.3	15.2	0.5	5.0	10.2				
L18	228.6	Coal	35.0	35.9	0.91	153.6	428	421	71.7	27.9	0.4	9.0	17.2	1.2		0.5	0.43
L17	229.6	Coal	35.6	33.1	0.22	158.1	478	423	35.5	63.3	1.2	45.0	16.3	1.4		0.6	
L16	230.9	Coal	25.2	47.2	0.17	277.9	589	423	40.4	58.8	0.8	27.2	30.8			0.8	
L15	231.7	Coal	23.9	52.1	0.23	158.5	304	424	67.9	31.9	0.2	7.0	20.3	3.1	0.8	0.7	
L14	232.1	Coal	15.8	61.0	0.29	304.2	499	425	46.7	52.5	0.8	38.3	13.0	0.9		0.3	
L13	233.6	Coal	13.6	63.7	0.17	282.3	443	425	45.8	52.7	1.5	39.3	12.7			0.7	
L12	236.1	Coal	21.0	58.4	0.27	177.5	304	423	67.2	31.9	0.9	19.3	10.9	1.3		0.4	
L11	245.5	Oil shale	45.4	21.8	0.25	79.9	367	422	77.5	22.2	0.3	9.0	12.5	0.7			
L10	251.8	Coal	30.4	44.1	0.36	154.6	351	425	83.4	15.9	0.7	4.9	8.5	1.6	0.7	0.2	
L9	255.0	Coal	21.3	49.3	0.51	170.1	345	426	77.2	21.8	1.0	9.7	11.7			0.4	
L8	273.0	Oil shale	54.0	7.4	0.11	18.9	256	426	83.6	16.1	0.3	7.4	7.3	0.8		0.6	
L7	281.7	Coal	30.0	48.3	0.27	257.7	534	425	43.3	55.9	0.8	33.4	22.1	0.4			
L6	285.5	Coal	28.6	43.6	1.11	137.7	316	422	79.7	19.7	0.6	12.9	6.3			0.5	0.44
L5	300.3	Oil shale	50.8	13.6	0.12	19.1	140	425	77.6	21.8	0.6	14.5	7.1	0.2			
L4	317.5	Oil shale	61.0	5.2	0.08	8.2	158	423	72.2	27.4	0.4	11.4	15.7	0.3			
L3	332.2	Oil shale	47.1	15.3	0.13	44.3	289	425	50.2	49.0	0.8	30.0	15.8	1.9	0.2	1.1	
L2	342.0	Oil shale	57.9	6.9	0.05	9.8	142	428	69.8	29.5	0.7	17.2	10.0	2.0	0.3		
L1	371.9	Oil shale	48.7	17.8	0.06	36.4	204	429	81.2	18.5	0.3	7.1	8.9	1.6		0.9	

* Others represent the other liptinite, including alginite, suberinite, and liptodetrinite;

+ mmf indicates the mineral matter-free basis.