

Table S-1 The melting points of WCO-based waxes and other control samples.

Sample	Initial melting temperature/°C	Complete melting temperature/°C
WCO	34	37
E-WCO	38	41
A1	41	44
A2	46	49
A3	54	56
SA	57	58
B1	35	40
B2	33	38
B3	34	39
CBS	46	50
SW	51	54

Table S-2 The Lovibond color codes of WCO-based waxes and other control samples.

Sample	Y(Yellow)	R(Red)	B(Blue)	Light field	Dark field
WCO	51.1	24.3	2.1	0	0
E-WCO	34.0	10	0	0.5	0
A1	25.2	6	0	0	0.2
A2	16.1	2.3	0	0	0.6
A3	8.1	1.8	0	0	0.1
SA	0.4	0.1	0	0	0
B1	26.7	9	0	0	0
B2	20	7.4	0	0	0
B3	15	3.7	0	0	0
CBS	3.4	0.3	0	0.4	0
SW	12.1	0.7	0	0	0

Table S-3 The penetration indexes of WCO-based waxes and other control samples.

Sample	Penetration index /mm
WCO	-
E-WCO	22.68±0.33
A1	5.67±0.16
A2	2.95±0.15
A3	1.53±0.12
SA	0.28±0.0025
B1	30.82±0.87
B2	31.38±0.30
B3	27.03±0.99
CBS	15.42±0.58
SW	5.46±0.12

Table S-4 The combustion times of WCO-based waxes and other control samples.

Sample	Combustion time /min
WCO	-
E-WCO	42±4
A1	169±5
A2	227±8
A3	335±10
SA	615±13
B1	90±4
B2	49±5
B3	83±6
CBS	103±7
SW	276±9

Table S-5 The moisture contents of WCO-based waxes and other control samples.

Sample	Moisture content / wt%
WCO	0.34
E-WCO	0.43
A1	0.40
A2	0.36
A3	0.28
SA	0.50
B1	0.32
B2	0.34
B3	0.40
CBS	0.32
SW	0.51

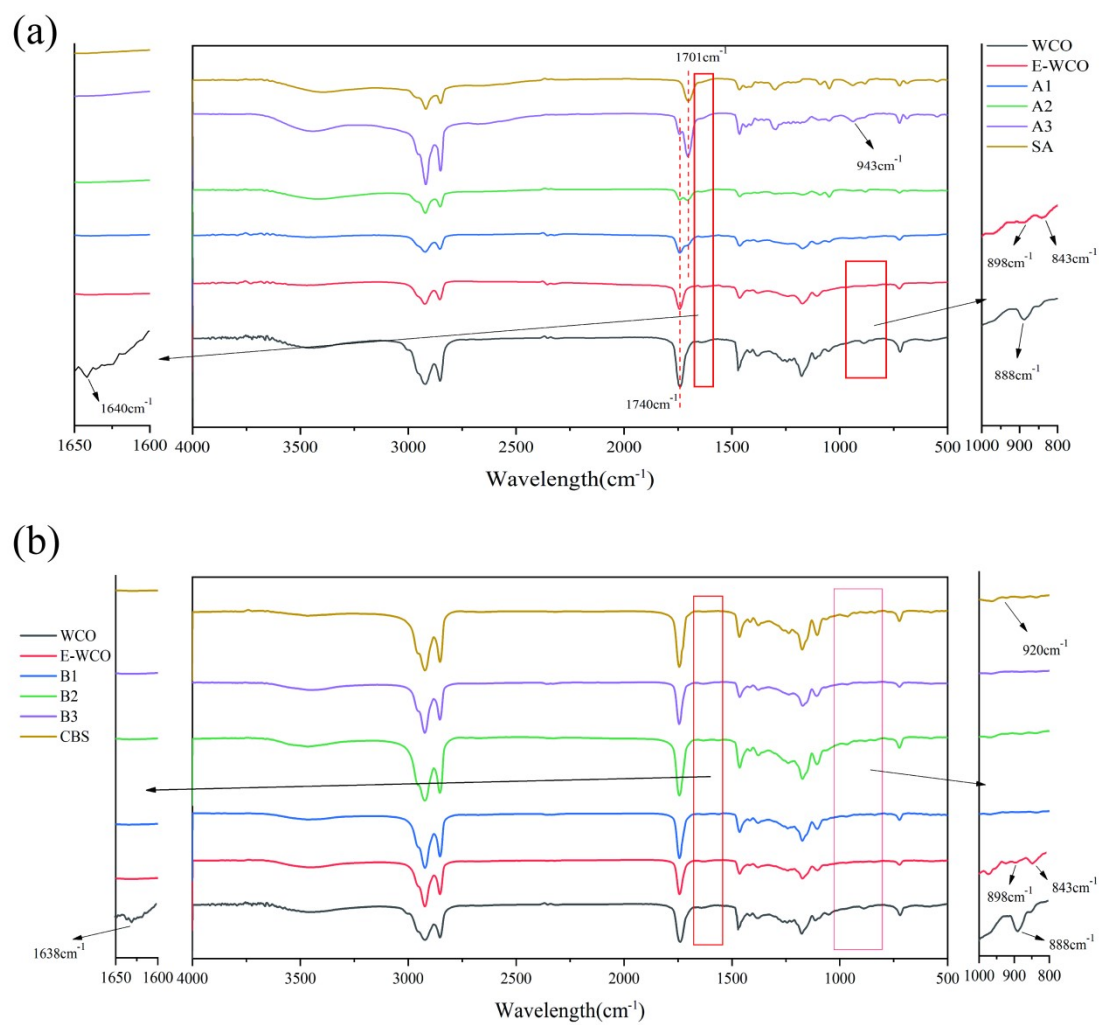


Fig. S-1 IR spectra of WCO-based waxes and other control samples.

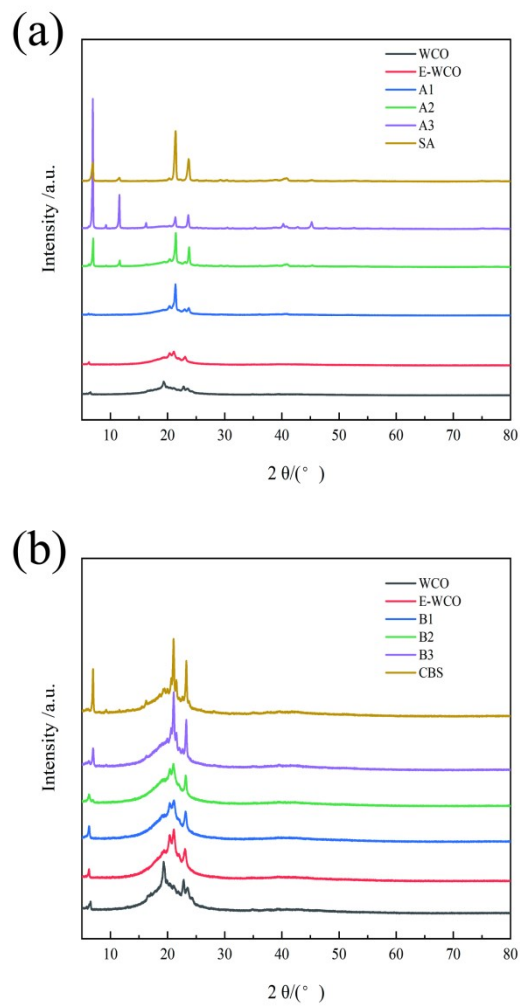


Fig. S-2 PXR D patterns of WCO-based waxes and other control samples.