

Title: Upgrading biochar via co-disposal of agricultural biomass and PETE wastes

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Supplementary Information

Number of pages: 7 (including a cover page)

Number of tables: 2

Number of figures: 5

Table S1. Identified compounds released from PETE/RS (20:80 v/v)-derived biochar via gas chromatography-mass spectrometry analysis.

Compound name	Chemical formula	Molecular weight	Similarity index (%)
2-Propanone	C <sub>3</sub> H <sub>6</sub> O	58	91
2-Propanol	C <sub>3</sub> H <sub>8</sub> O	60	83
2-Pentene	C <sub>5</sub> H <sub>10</sub>	70	86
2-Methyl-1-butene	C <sub>5</sub> H <sub>10</sub>	70	85
Propanoic acid, 2-hydroxy, ethyl ester	C <sub>5</sub> H <sub>10</sub> O <sub>3</sub>	118	83
Diacetone alcohol	C <sub>6</sub> H <sub>12</sub> O <sub>2</sub>	116	88
Hexanoic acid, 2-methyl-3-oxo, ethyl ester	C <sub>9</sub> H <sub>16</sub> O <sub>3</sub>	172	83

Table S2. Calculated isotherm parameters of Langmuir models for sorption of DNT, DCP, Pb, chromate, and selenate onto PETE/RS-derived biochar.

Contaminants	Types of biochar	Q (mg/g)	K <sub>L</sub> (L/mg)	R <sup>2</sup>
DNT	RS 550 °C	5.13	2.46	0.94
	RS+PETE (9:1 v/v) 550 °C	9.51	0.10	0.94
	RS+PETE (8:2 v/v) 550 °C	10.2	0.09	0.92
	RS 900 °C	19.2	0.39	0.93
	RS+PETE (9:1 v/v) 900 °C	10.6	0.39	0.95
	RS+PETE (8:2 v/v) 90 °C	11.7	0.52	0.92
DCP	RS 550 °C	11.5	0.02	0.91
	RS+PETE (9:1 v/v) 550 °C	12.3	0.01	0.94
	RS+PETE (8:2 v/v) 550 °C	12.5	0.01	0.93
	RS 900 °C	16.4	0.02	0.91
	RS+PETE (9:1 v/v) 900 °C	19.1	0.02	0.90
	RS+PETE (8:2 v/v) 90 °C	20.2	0.01	0.94
Pb	RS 550 °C	95.0	0.23	0.96
	RS+PETE (9:1 v/v) 550 °C	111	0.37	0.96
	RS+PETE (8:2 v/v) 550 °C	115	5.24	0.98
	RS 900 °C	90.1	0.13	0.94
	RS+PETE (9:1 v/v) 900 °C	115	4.65	0.98
	RS+PETE (8:2 v/v) 90 °C	118	5.77	0.99
Chromate	RS 550 °C	1.20	0.00	0.84
	RS+PETE (9:1 v/v) 550 °C	5.51	0.05	0.91
	RS+PETE (8:2 v/v) 550 °C	5.82	0.04	0.92
	RS 900 °C	4.93	0.02	0.91
	RS+PETE (9:1 v/v) 900 °C	5.91	0.01	0.91
	RS+PETE (8:2 v/v) 90 °C	6.10	0.01	0.93
Selenate	RS 550 °C	12.0	0.01	0.93
	RS+PETE (9:1 v/v) 550 °C	4.52	0.01	0.94
	RS+PETE (8:2 v/v) 550 °C	4.23	0.01	0.93
	RS 900 °C	0.98	0.00	0.92
	RS+PETE (9:1 v/v) 900 °C	2.02	0.01	0.91
	RS+PETE (8:2 v/v) 90 °C	2.88	0.01	0.91

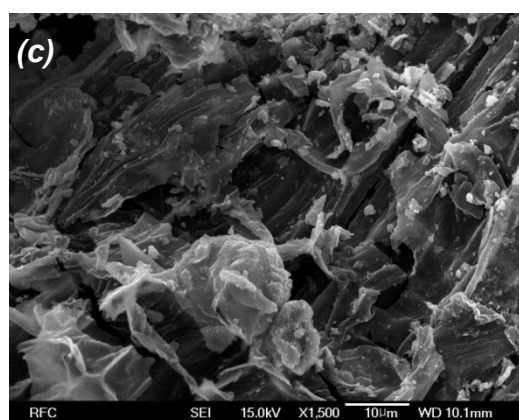
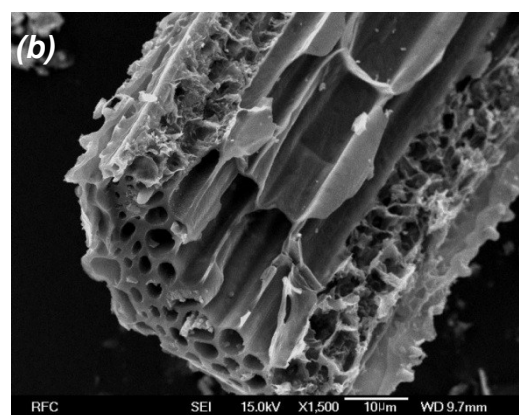
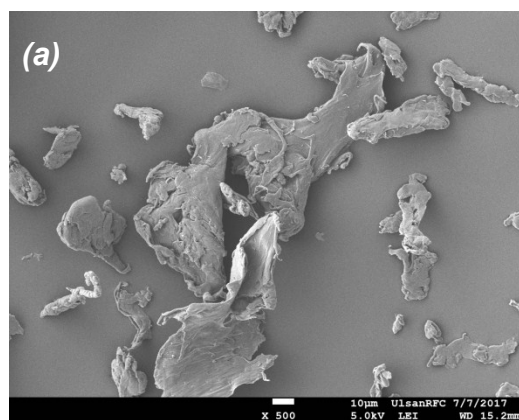


Fig. S1. Scanning electron microscopy images of (a) ground PETE, (b) RS biochar, and (c) PETE/RS (20:80 v/v)-derived biochar pyrolyzed at 550 °C.

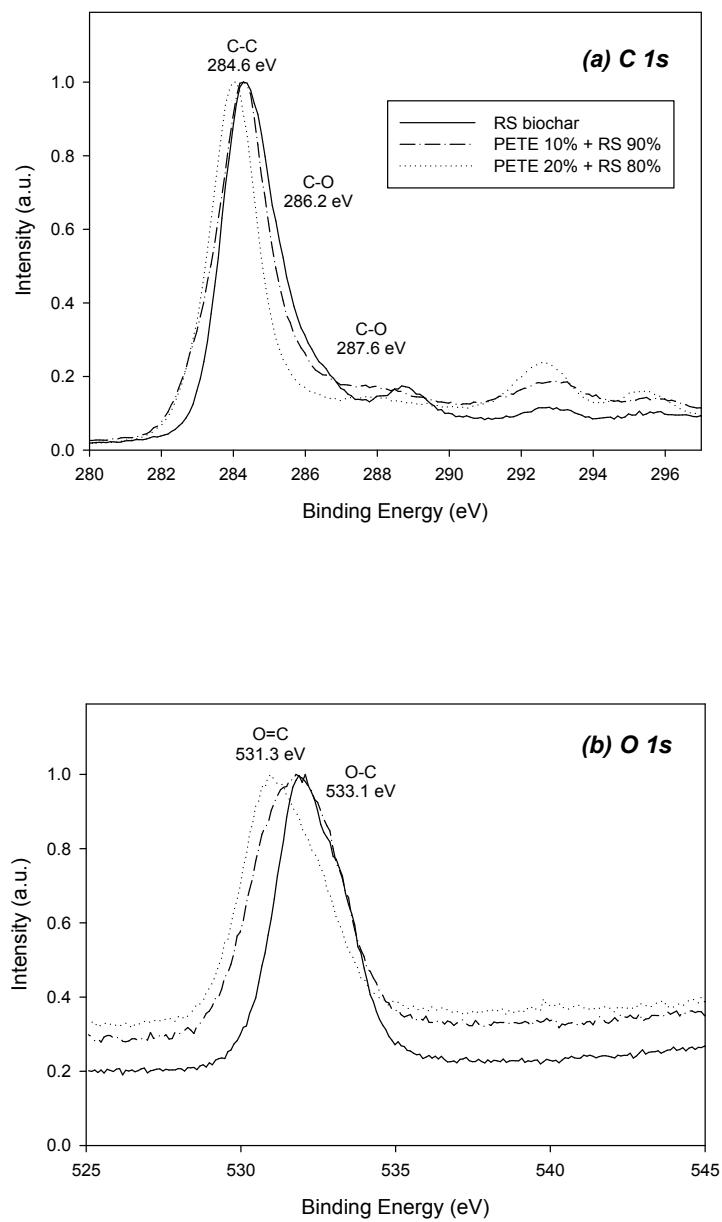


Fig. S2. X-ray photoelectron spectroscopy spectra of PETE/RS-derived biochars pyrolyzed at 550 °C; (a) C 1s and (b) O 1s.

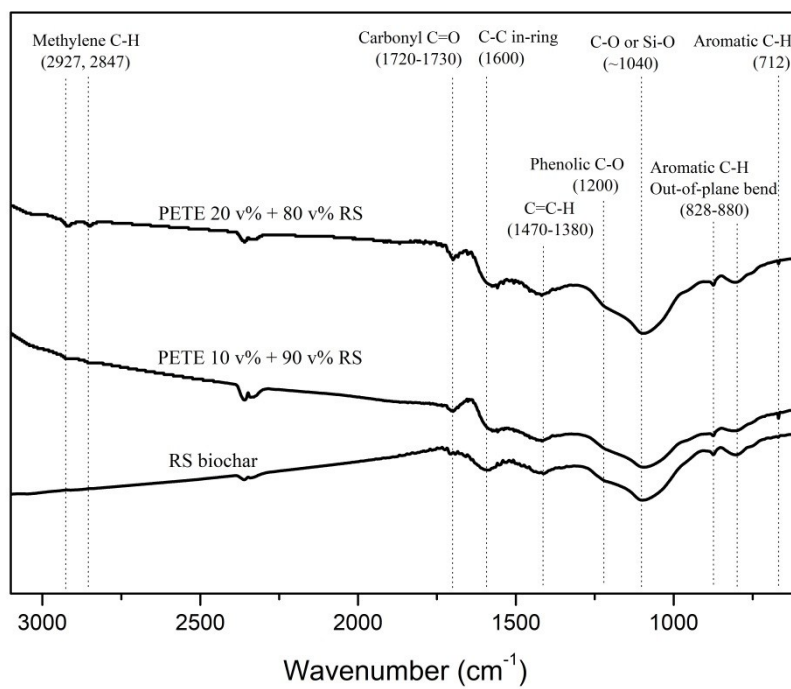


Fig. S3. FT-IR spectra of PETE/RS-derived biochars pyrolyzed at 550 °C.

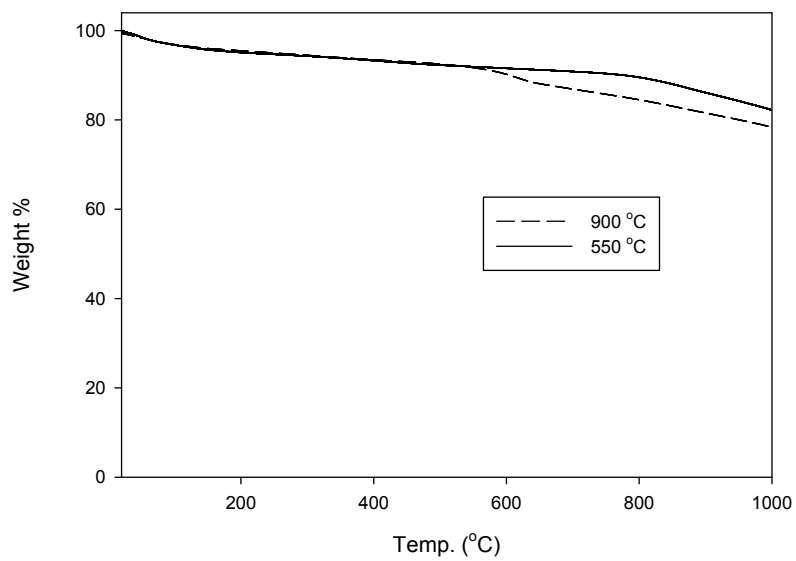


Fig. S4. Thermogravimetric analysis (TGA) curves of PETE/RS (80:20 v/v)-derived biochars.

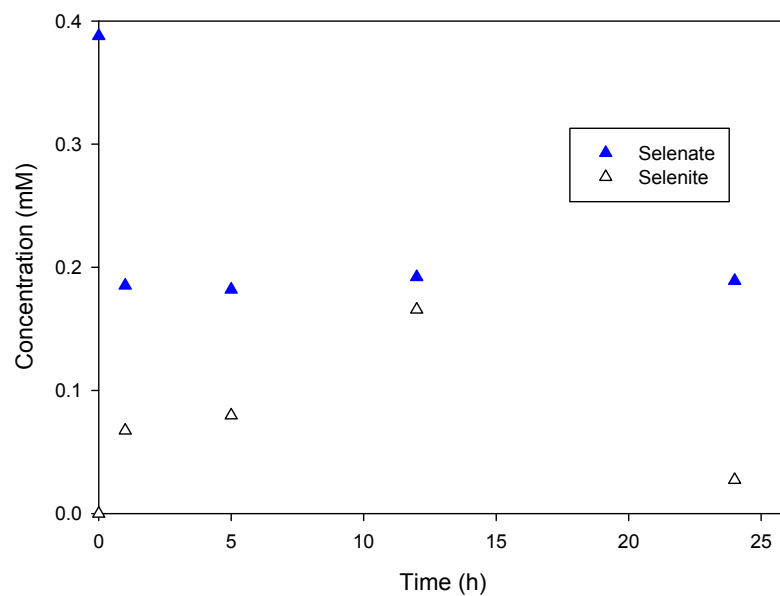


Fig. S5. Concentrations of selenate and selenite in the presence of PETE/RS (20/80 v/v)-derived biochar at pH 7.4 (0.1 M HEPES buffer).