

# Sustainable and regenerable alkali metal-containing carbons derived from seaweed for selective CO<sub>2</sub> post-combustion capture

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**Table S1** Details about inorganic elements detected by EDX analyses for all samples.

LH_S		LH_S800		LH_S800PA		LH_S800CA	
Elem	Wt%	Elem	Wt%	Elem	Wt%	Elem	Wt%
Al	2.98	Al	0.09	Al	n.d.	Al	2.48
Ca	2.59	Ca	1.21	Ca	0.71	Ca	n.d.
Cl	1.89	Cl	8.07	Cl	1.79	Cl	0.46
Cu	1.26	Cu	0.49	Cu	n.d.	Cu	n.d.
I	0.73	I	0.55	I	n.d.	I	n.d.
K	0.6	K	9.03	K	1.05	K	n.d.
Mg	0.33	Mg	0.58	Mg	6.03	Mg	n.d.
Na	0.27	Na	3.9	Na	12.5	Na	n.d.
P	0.2	P	0.33	P	5.0	P	n.d.
S	0.06	S	1.69	S	3.1	S	0.56

Elem stands for element.

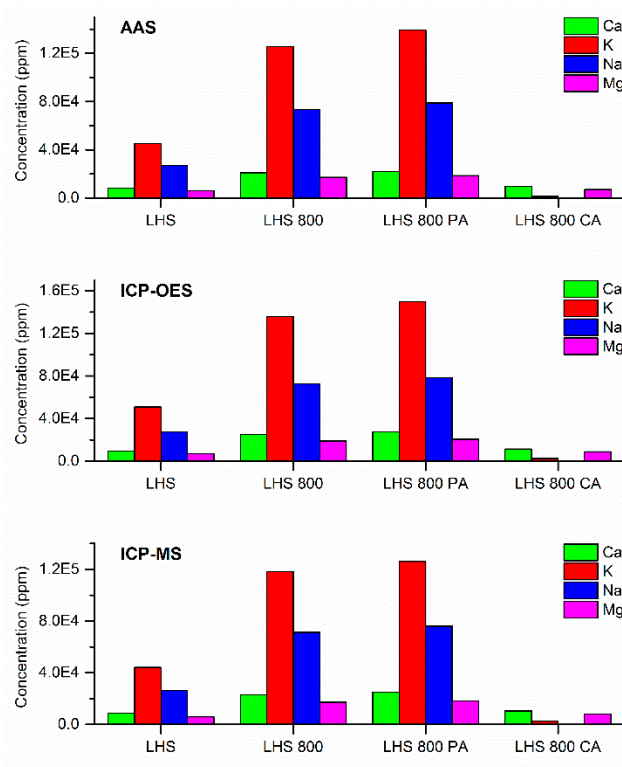
**Table S2** CO<sub>2</sub> uptakes at a total pressure of 1 bar.

Sample ID	35 °C, 1 bar	53 °C, 0.15 bar
	mg CO <sub>2</sub> ·g <sup>-1</sup>	mg CO <sub>2</sub> ·g <sup>-1</sup>
LH_S800	26.5	10.4
LH_S800PA	28.4	10.7
LH_S800CA	57.2	6.3
AR	N.R.	8.3
MgO	N.M.	4.6

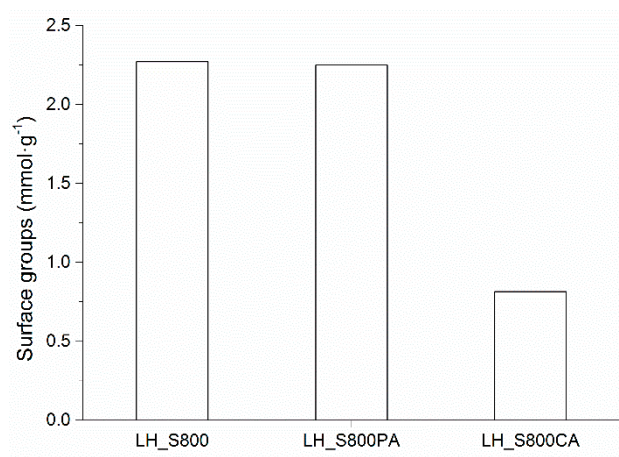
N.R. stands for not reported. N.M. stands for not measured.

Table S 3: Yields obtained for LH\_800, LH\_S800PA and LH\_S800CA.

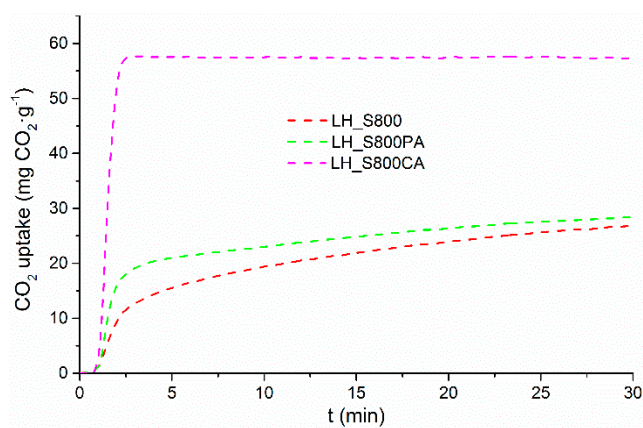
Sample ID	Yield
	wt%
LH_S800	27.0
LH_S800PA	23.5
LH_S800CA	3.5



**Figure S 1** Alkali metal concentration measured by Atomic Absorption Spectroscopy (AAS), Inductively coupled plasma optical emission spectrometry (ICP-OES), and Inductively coupled plasma mass spectrometry (ICP-MS) for raw *Laminaria* (LH\_S), pyrolysed *Laminaria* (LH\_S800), physically-activated char (LH\_S800PA) and chemically-activated (LH\_S800CA) char.



**Figure S 2** Basic functionalities measured by Boehm's titration for pyrolyzed macroalgae (LH\_S800), physically-activated counterpart (LH\_S800PA), and chemically-activated counterpart (LH\_S800CA).



**Figure S 3** CO<sub>2</sub> adsorption kinetic at 35 °C and 1 bar (total pressure of 1 bar) for pyrolyzed macroalgae (LH\_S800), physically-activated counterpart (LH\_S800PA), and chemically-activated counterpart (LH\_S800CA).