Biochar And Activated Carbon Processing Of Agricultural Residues (Corn Stover And Orange Peels)

Tech ID: 32872 / UC Case 2022-871-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2023031109	10/05/2023	2022-871

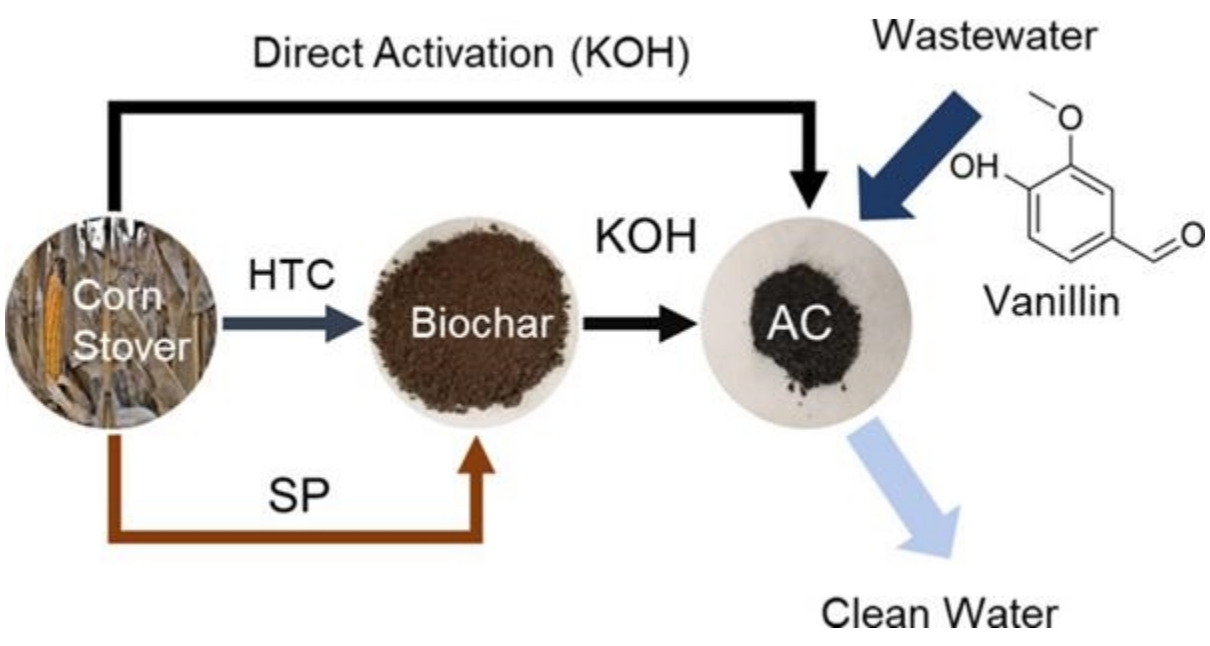
FULL DESCRIPTION

Background:

In a circular bioeconomy, maximizing the use of ligno-cellulosic-biomass waste is paramount for the full utilization of energy, products, and chemical commodities with minimal environmental harm. One beneficial and low-cost value-added product that can be produced from agricultural waste is activated carbon (AC). AC has several uses, especially as an adsorbent for wastewater treatment. Wastewater treatment plants utilize AC to remove pollutants. The AC properties can often be tailored by changing the reaction parameters for the preparation of biochar precursors and activation methods. AC can be made from biochar precursors using either physical or chemical activation. Currently there is a need for improved methods for preparing activated carbon – methods that are less expensive, produce less waste and provide better control of the properties of the carbon product.

Technology:

Researchers led by Prof. Abdul-Aziz at UCR, have developed a patent pending, process for the thermal conversion of agricultural waste to activated carbon. The conversion process parameters can be varied to modify the properties of the activated carbon.



Schematic illustrating the process for converting ag-waste to activated carbon for use in water treatment

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OTHER INFORMATION

KEYWORDS

Activated carbon, Biochar, Agwaste,

Circular economy, Water purification,

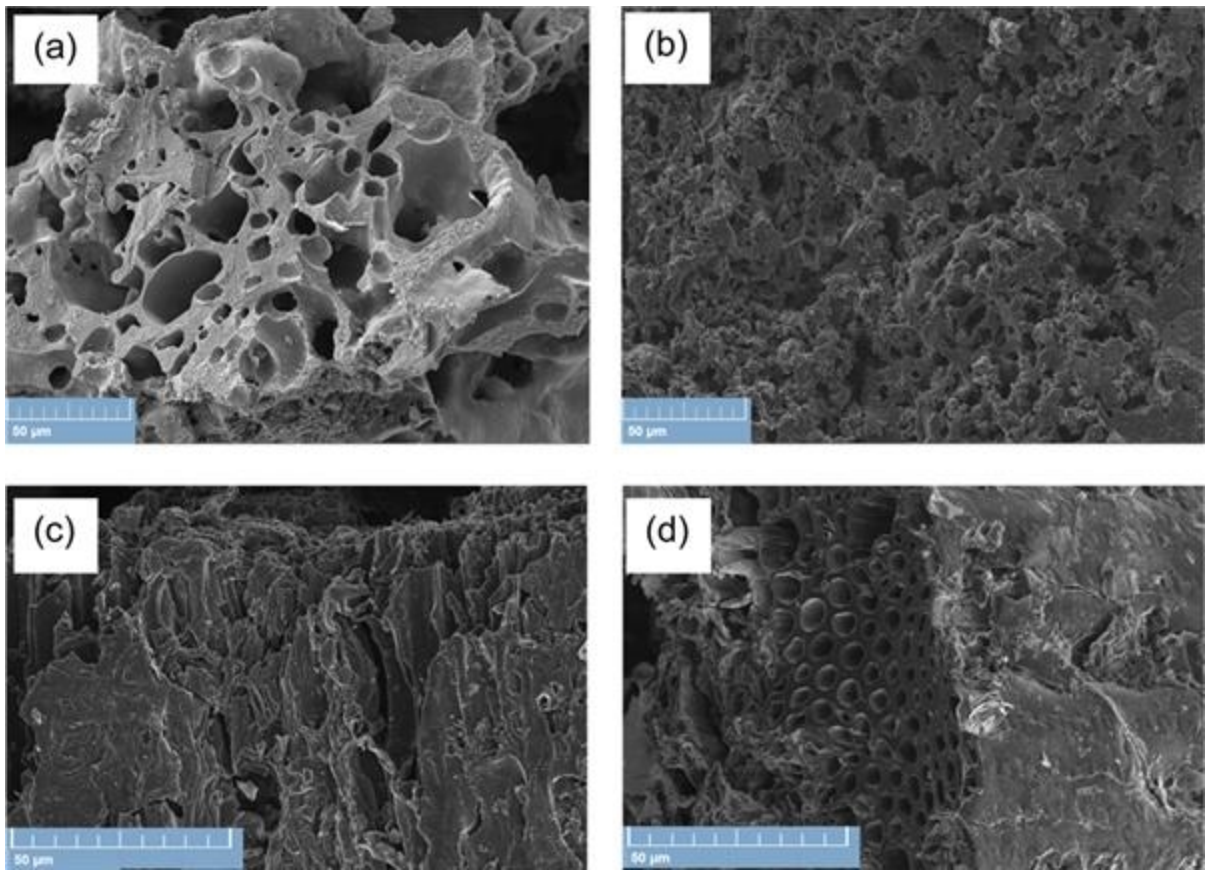
Water treatment

CATEGORIZED AS

- **Agriculture & Animal Science**
  - Other
- **Engineering**
  - Engineering
- **Materials & Chemicals**
  - Composites

RELATED CASES

2022-871-0



SEM images of AC. (a) AC HTC 200 °C 1 h (mag: 1.14k×). (b) AC HTC 240 °C 2 h (mag: 1.14k×). (c) AC SP 400 °C 1 h (mag: 1.0k×). (d) AC SP 550 °C 1 h (mag: 1.0k×). SEM images of AC. (a) AC HTC 200 °C 1 h (mag: 1.14k×). (b) AC HTC 240 °C 2 h (mag: 1.14k×). (c) AC SP 400 °C 1 h (mag: 1.0k×). (d) AC SP 550 °C 1 h (mag: 1.0k×).

ADVANTAGES

- Tailorable (More control on properties of formed activated carbon)
- Cheaper method for formation of activated carbon (at least 10% cheaper)
- More environmentally conscious (use of agricultural waste)

SUGGESTED USES

Conversion of agricultural waste into customizable activated carbon for the removal of contaminants in water and wastewater applications.

STATE OF DEVELOPMENT

Currently, it is at the end of the experimental stage.

RELATED TECHNOLOGY

Please see all water treatment related inventions at UCR

RELATED MATERIALS

- Physiochemical Properties of Biochar and Activated Carbon from Biomass Residue: Influence of Process Conditions to Adsorbent Properties

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