

Production method of carbon material

Large amount production of carbon material at relatively low temperature

Overview

CVD and electrochemical method are known to produce carbon material such as carbon nanotubes or graphenes. In the CVD process, carbon material is produced at high temperature in order to decompose the precursor molecule that provides the carbon. The hydrothermal electrochemical method can produce carbon material at lower temperature than CVD method. However, the amount of carbon material produced by this method is small.

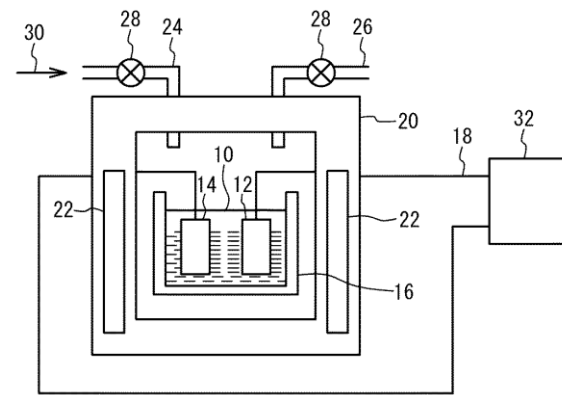
This invention is to enable to produce large amount of carbon material at relatively low temperature. In this production method, carbon material is produced from aqueous solution in which the temperature is 100°C or higher, the pressure is greater than 1 atm, and soluble carbonaceous precursors by a hydrothermal electrochemical method. The produced carbon material can be composed of at least one of diamond like carbon, carbon nanotube, graphene, diamond. This invention is to enable to produce large amount of carbon material at relatively low temperature.

Product Application

- ❑ Solar cell, rechargeable battery
- ❑ Tool, machine part, construction material
- ❑ Automobile and aircraft

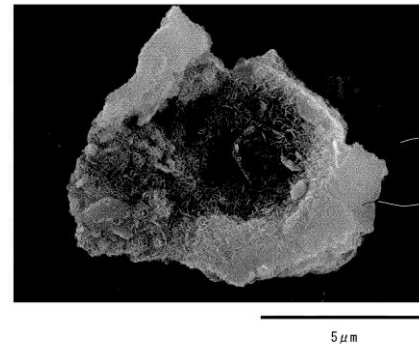
IP Data

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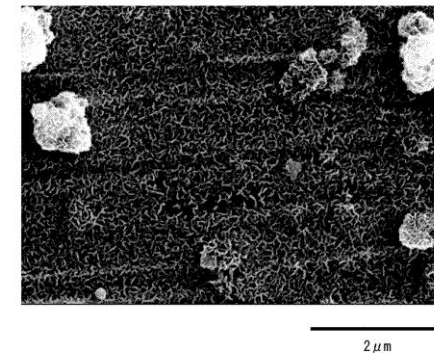


- 10. Aqueous solution
- 12. Working electrode
- 14. Counter electrode
- 16. Container
- 18. Wire
- 20. Sealed container
- 22. Heater
- 24. Input tube
- 26. Discharge tube
- 28. Open/close valve
- 30. Gas
- 32. Voltage source

Production of amorphous carbon and graphene



Amorphous carbon



Graphene

Related Works

[1] Takaaki Tomai, Yuta Nakayasu, Yusuke Okamura, Shunichi Ishiguro, Naoki Tamura, Shusuke Katahira and Itaru Honma, "Bottom-up synthesis of graphene via hydrothermal cathodic reduction", **Carbon**, 158, 131 -136 (2020)

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