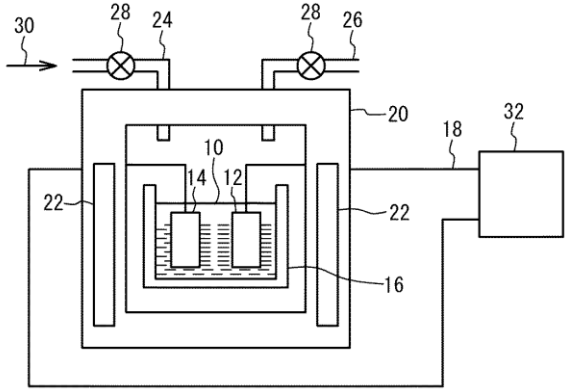
Tohoku Univ. Technology

Production method of carbon material

Large amount production of carbon material at relatively low temperature



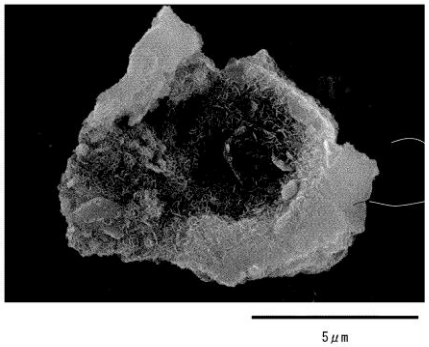
10. Aqueous solution
12. Working electrode
14. Counter electrode
16. Container
18. Wire
20. Sealed container
22. Heater
24. Input tube
26. Discharge tube
28. Open/close valve
30. Gas
32. Voltage source

Overview

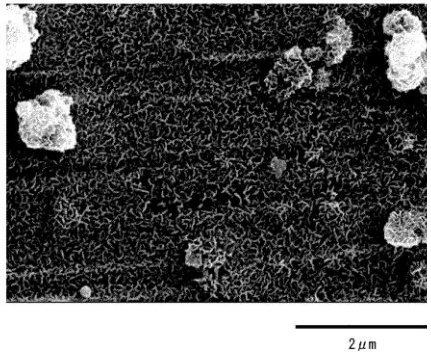
CVD and electrochemical method are known to product carbon material such as carbon nanotubes or graphenes. In the CVD process, carbon material is produced at high temperature in order to decompose the precursor molecule that provides the carbon. The hydrothermal electrochemical method can produce carbon 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℃ 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.

Production of amorphous carbon and graphene



Amorphous carbon



Graphene

Product Application

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

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)

IP Data

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