Multiwalled Carbon Nanotube Electrode and a Method of Synthesis Thereof

IITM Technology Available for Licensing

Problem Statement

- Existing Multiwalled carbon nanotubes synthesis methods **yield insufficient MWCNTs, hindering scalability and cost-efficiency**.
- The use of **expensive catalysts** drives up production costs, limiting market competition.
- Current technologies **struggle to achieve high capacities and durable batteries**, hindering their adoption in various applications.
- Traditional sensor fabrication method is complex and time-taking, limiting **widespread adoption of sensitive & reliable sensor technology**.
- The **absence of standardized protocols** and quality control measures in MWCNT production leads to varying product quality, challenging **industry adoption & regulatory compliance**.
- Hence, the instant invention is needed to address these issues by disclosing a **scalable & cost-effective method** to synthesize **high yield Multiwalled Carbon Nanotube Electrode.**

Technology Category / Market

Categories: Micro & Nano Technologies | Energy, Energy Storage & Renewable Energy
Industry: Electronics and sensors, Energy, Healthcare, Aerospace, Automotive
Applications: Lithium-ion battery, Biosensors, Fuel cells, Nanoelectronics, Strain Sensors
Market: The global multi-walled carbon nanotubes market size is expected to grow from **$5.25 Billion** in **2021** to **$10.74 Billion** by **2028**, rising at **10.8% CAGR** from 2021-2028.

Technology

A method for Multiwalled Carbon Nanotubes (MWCNTS) Electrode synthesis is disclosed here.
FIG. 1 illustrates a schematic diagram of a reactor useful for catalytically synthesizing **MWCNTs.**
FIG. 2A & 2B depict low and high resolution SEM images of MWCNTs synthesized using **LPG.**
FIG. 2C & 2D depict low and high resolution SEM images of MWCNTs synthesized using acetylene.

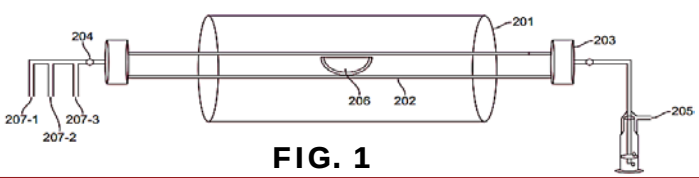
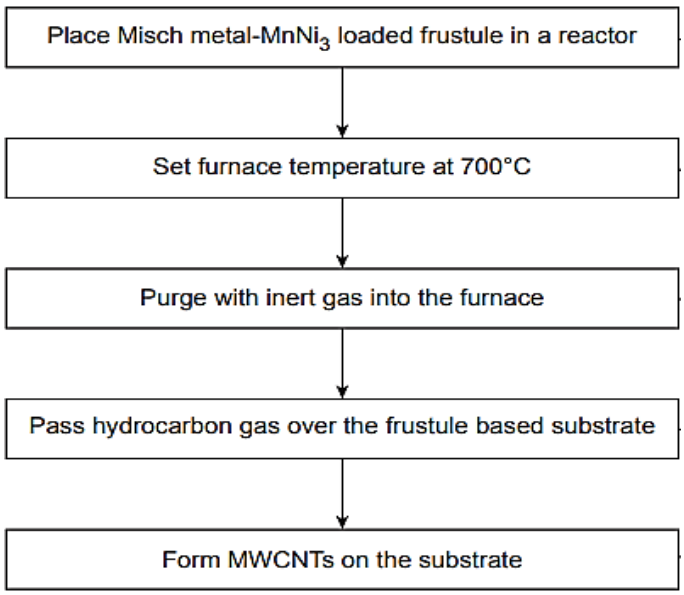


FIG. 1

Method



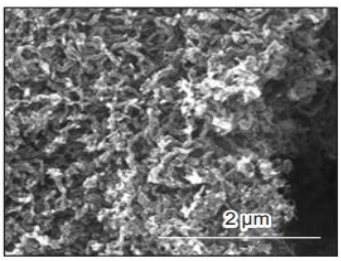


FIG. 2A

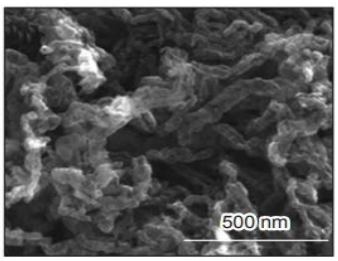


FIG. 2B

FIG. 2C

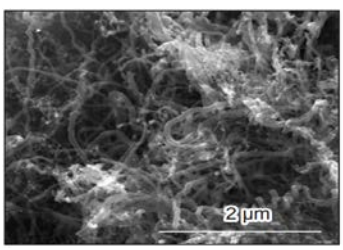
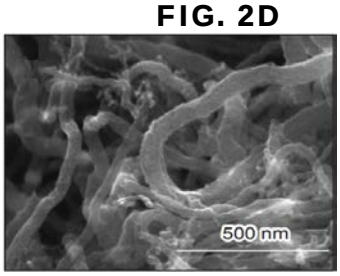


FIG. 2D



Intellectual Property

IITM IDF No: **1773** | IP No: **494415 (Granted)**

TRL (Technology Readiness Level)

TRL-4: Validated in Laboratory

Research Lab

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Key Features / Value Proposition

User perspective:-

- High-performance, long-lasting batteries with enhanced energy storage capabilities.
- Reliable and efficient biosensors for accurate and sensitive detection. Versatile strain sensors for precise and real-time monitoring.

Industrial perspective:-

- Cost-effective production method for large-scale manufacturing.
- Increased production yield and purity, reducing overall production costs.
- Enhanced competitiveness and market potential in various industries.

Technology perspective:-

- Cutting-edge synthesis technique utilizing advanced catalyst and substrate materials.
- Optimization of reaction parameters for superior MWCNTs quality and properties.

FIG. 3A depicts results of Nitrogen adsorption (filled symbols)/desorption (empty symbols) isotherms and BJH pore-size distribution curves for MWCNTs synthesized using acetylene.

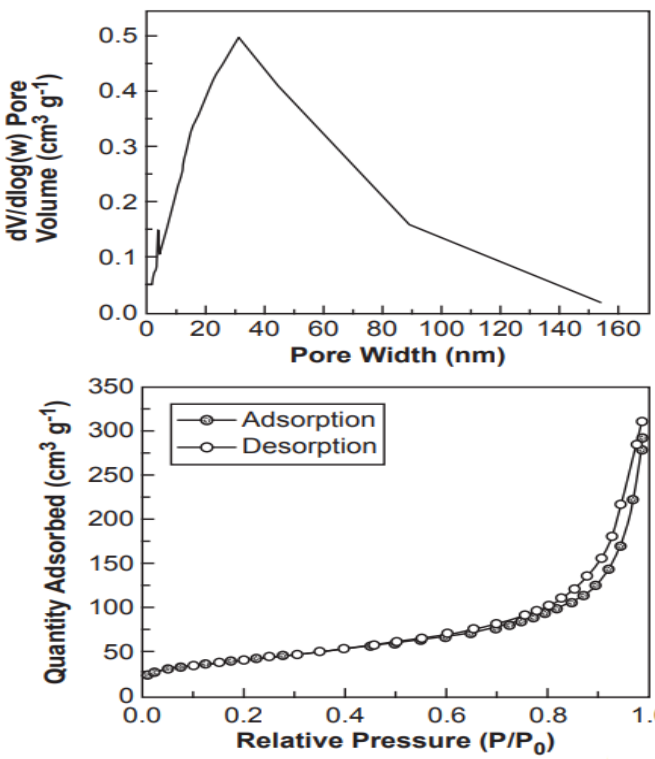
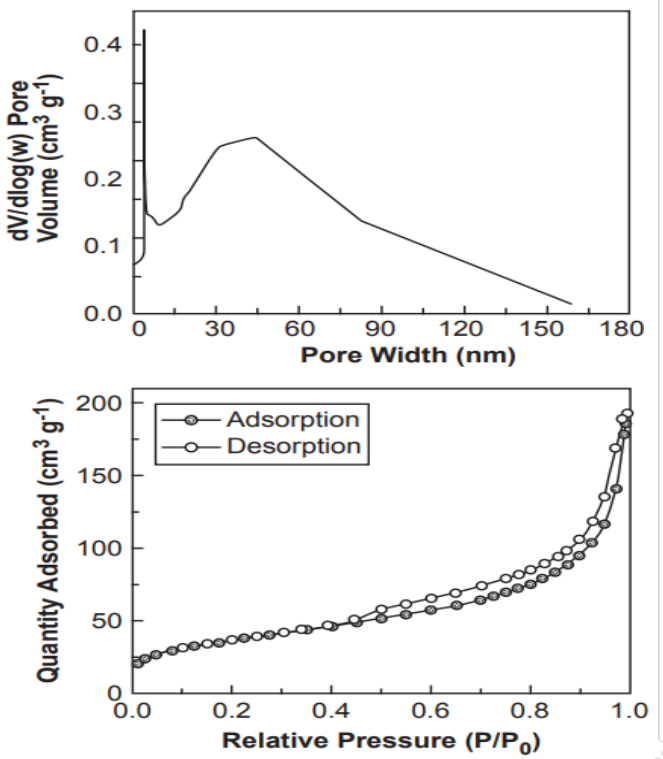


FIG. 3B depicts results of Nitrogen adsorption (filled symbols)/desorption (empty symbols) isotherms and BJH pore-size distribution curves for MWCNTs synthesized using LPG.



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