

A PRINTABLE TRANSPARENT WI-FI ANTENNA

IITM Technology Available for Licensing

Problem Statement

- Currently, ever-increasing number of devices in small spaces, all operating in same frequency band, has led to problems like interference, congestion, Wi-Fi fading, dead spots etc.
- Hence, there is need to **fabricate flexible transparent Wi-Fi antennas using high conductivity materials**, preferably metals to provide a strong, stable wireless connection in often difficult to reach locations.

Technology Category/Market

Category – Advanced Material and Manufacturing, Information and Communications Technology

Applications –Advanced Materials, Wireless/ Communications systems, Automobiles

Industry –Manufacturing /Chemical, Information and Communications Technology

Market -The global advanced materials market size was accounted at USD 61.35 billion in 2022 and it is expected to reach around USD 112.7 billion by 2032.

Technology

- ❑ This invention discloses a **printable, transparent and flexible antenna for Wi-Fi applications**, radiating at **2.4 GHz and 5.8 GHz**, using a **printable nanocomposite ink**, based on metallic NWs and conducting polymers.
- ❑ Includes a **method of preparing a nanocomposite ink comprising:**

• **1 wt% PEDOT: PSS long chain polymer dispersed in water**

• **5 wt% metallic nanowires in the solution**

- ❑ The prepared PEDOT :PSS is added to metallic nano wires at 12 vol% ratio
- ❑ The metallic nanowires are sonicated to reduce dimensions <1/50th of apparent nozzle diameter.
- ❑ Also, includes a **method of fabricating the printable Wi-Fi antenna** by the steps of:

• **printing two passes of the nanocomposite ink with 4.5 mg/ml concentration of metallic nanowires at 60°C**

• **annealing the printed pattern (100oC /1hr) and connecting an adapter to antenna thereafter.**

Insert Image

Fig. 1

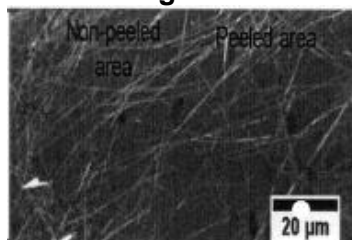


Fig. 2

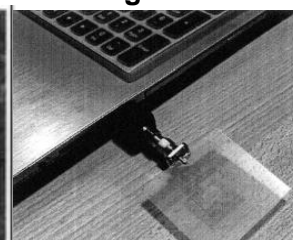


Fig.1 The SEM images after annealing at 300°C confirms the improved thermal stability of the proposed ink

FIG 2: is a representation of the printed antenna

Key Features / Value Proposition

- **Dual band Wi-Fi antenna** printed with **optimized nano-composite ink** comprising **metallic nanowires** and long chain polymer **PEDOT: PSS** exhibits **improved sheet resistance, flexibility, omni- directional radiation, durability, thermal stability conductivity and transparency**
- Any **metallic NW-based antenna can be fabricated** especially 2D antenna configurations such as dipole, monopole, microstrip, patch, and for RFID antennas.
- Requires **less time, simple and has the potential for direct patterning**

Intellectual Property

- IITM IDF Ref. 1796
- IN 428191 (Granted)

TRL (Technology Readiness Level)

TRL- 2 Technology Concept Formulated

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