Natural rosin based high performance conducting ink

This innovation introduces a **natural rosin-based conductive ink** as a sustainable, low-cost alternative to conventional metal- or polymer-based inks used in printed electronics such as printed circuit boards, sensors, RFID tags, and flexible displays. However, existing conductive ink formulations face significant limitations. Traditional Metal-based inks using silver or copper nanoparticles, are expensive, prone to oxidation, and require post-deposition sintering processes. Similarly, indium tin oxide (ITO) and intrinsically conductive polymers (ICPs)) face issues like brittleness, poor solubility, and limited mechanical stability, making them less suitable for cost-effective and sustainable electronics. The new innovation addresses the gaps in current solutions by introducing a natural rosin-based conductive ink, offering a rapid, single-step, and cost-effective process.

Natural rosin based conducting ink

Rosin, a biologically derived resin, serves as a natural binder, improving the mechanical properties, adhesion, and dispersion of conductive particles like carbon black, graphite, and graphene. The combination of rosin with carbonaceous materials produces a high-performance ink that eliminates the need for costly metals and complex processing. This ink is versatile and supports various printing methods, including inkjet, gravure, aerosol jet, flexographic, and screen printing, ensuring broad industrial adaptability**.** The formulation combines rosin with eco-friendly carbon materials in an optimized ratio to achieve high conductivity and stability, eliminating the reliance on toxic or costly materials such as silver or indium tin oxide (ITO). The ink can be directly applied to flexible and rigid substrates without additional processing, making it suitable for diverse applications in printed electronics (including sensors, circuit boards, RFID tags, and flexible displays, etc.).

Salient Features:

- **Cost-Effective:** Made from natural rosin and carbon materials, significantly reducing production costs.
- **Eco-Friendly:** Replaces hazardous metals with renewable rosin and environmentally friendly carbon materials, contributing to sustainable manufacturing practices and minimizing electronic waste.
- **Simplified Process:** Enables a fast, single-step application without the need for sintering.
- **Versatile Compatibility:** Suitable for multiple printing methods—inkjet, gravure, aerosol jet, flexographic, and screen printing.

Developed by
ICAR- National Institute of Secondary Agriculture, Ranchi, Jharkhand
Contact: Director, ICAR-NISA, Ranchi, Ph: 0651-2261156
E-mail: director.nisa@icar.gov.in

- **High Performance:** Rosin acts as a natural binder, enhancing adhesion, cohesion, and dispersion of conductive particles to achieve excellent conductivity and stability.

Benefits:

- **Reduced Manufacturing Costs:** Significant cost savings compared to expensive metal-based inks, enabling the production of affordable printed electronics.
- **Sustainable and Green Manufacturing:** Utilizes renewable, eco-friendly materials to reduce environmental impact and supporting a circular economy.
- **Enhanced Production Efficiency:** Features is simplified and single-step process with no need of complex post-processing steps, ensuring faster production cycles and increased output.
- **Wide Range of Applications:** Suitable for diverse printed electronics applications, such as Flexible displays, Wearable sensors, RFID tags, Smart packaging, Printed circuit boards and Medical devices.

Target market/Potential clients:

- **Electronics Manufacturers:** Flexible/wearable electronics, flexible displays, health monitors, smart textiles, PCB manufacturers.
- **Automotive Industry:** Producers of sensors, touch controls, and lightweight electronic components for electric/autonomous vehicles.
- **Healthcare & Medical Devices:** Makers of disposable sensors, diagnostic strips, and ECG electrodes needing biocompatible, flexible, low-cost materials.
- **Smart Packaging & IoT:** Companies producing RFID tags, NFC-enabled packaging, and smart labels for supply chain and retail.
- **Energy Sector:** Manufacturers of printed batteries, energy storage devices, and photovoltaic cells.

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