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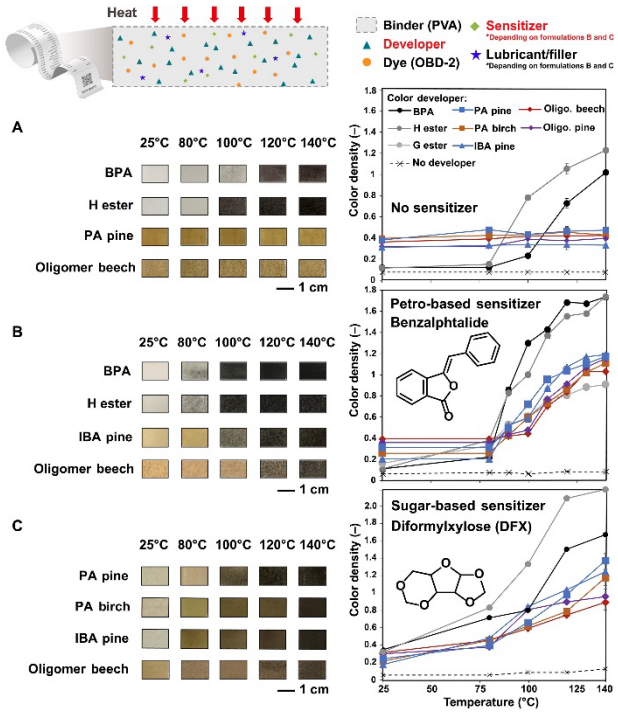
Licensing Opportunity

TTO – Technology Transfer Office

Bio-based heat sensitizer for thermal printing



Static sensitivity curves of thermal papers coated on PlanoJet paper (200 g m–2) (A) without sensitizer, (B) with benzalphtalide, and (C) with DFX as the sensitizer. The pictures show the developed thermal papers for various heating temperatures.

Ref. Nr

6.2518.3

Keywords

Bio-based heat sensitizer, thermal paper, leuco dyes, biodegradable, lignocellulosic biomass

Intellectual Property

WO2026002824

Publications

Nelis et al., Sci. Adv. 12, eadw9912 (2026)

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Description

A new class of bio-based, biodegradable and non-toxic heat sensitizers for thermal printing with leuco dyes, based on xylose-derived diacetal compounds (e.g., diformylxylose, dibutylxylose) produced directly from lignocellulosic biomass via Aldehyde-Assisted Fractionation (AAF. The compounds act as thermal sensitizers that lower the activation energy of color development in thermosensitive coatings, enabling sharp, durable images in thermal recording materials.

Advantages

Non-toxic, non-mutagenic and inherently biodegradable — replacing fossil-derived, bioaccumulative aromatic sensitizers found in recycled paper and waterways. White/colorless, boosts static sensitivity with both conventional (BPA/BPS) and lignin-derived developers, tunable polarity for formulation flexibility, and cost-competitive one-pot production scalable to multikilogram scale.

Applications

- Thermal recording technologies — thermal paper for receipts, labels, tickets and tags
- Thermochromic printing & temperature-indication systems — heat-responsive color-change materials
- Textiles, adhesives and coatings — sustainable, regulation-ready heat-sensitive formulations