

nCoating: Hard Yet Flexible Transparent Coatings

This technology addresses a long-standing bottleneck in flexible electronics: achieving both high hardness and flexibility in screen cover materials. We developed an ultra-wear-resistant optical coating based on in-situ grafting technology, using a POSS nano-network.

Through molecular-level innovation, the technology precisely constructs a 1–3 nm organic-inorganic hybrid network. After curing, it forms a highly uniform structure with multiple high-performance characteristics: optical-grade transparency (>98%), ceramic-like ultra-high hardness (9H), outstanding wear resistance, and exceptional bendability (over 500,000 folding cycles).

Industry Challenges

This breakthrough provides a critical materials solution for the next generation of flexible electronics, offering essential support for the advancement of applications such as flexible displays and wearable devices

Major Benefits

- **Customisable Functionality & Substrate Compatibility:** while maintaining high transparency, surface hardness, and bend resistance, the molecular structure is fully designable — enabling flexible integration of functional features such as anti-fingerprint and anti-fogging and ensuring compatibility with a wide range of substrates
- **Excellent Process Compatibility:** formulation and rheological properties are precisely optimised for industrial needs, ensuring seamless integration with mainstream display processes such as slot-die and roll-to-roll coating, with minimal need for production line modification

Application Areas

- Foldable electronic devices, such as foldable smartphones, foldable laptops, and flexible displays
- Applicable to various electronic device enclosures, including mobile phone back panels, tablet housings, laptop rear covers, and external modules of wearable devices

Collaborator(s)

Manufacturers of advanced materials, industrial raw material supply chain, foldable electronic devices

Award(s)

R&D 100 Awards, Edison Awards,
International Exhibition of Inventions Geneva



Foldable display screen protection, anti-smudge protective films, and photosensitive drum hard coating featuring ASTRI's nCoating technology

