

... China's Commemorative Series



Fig 3: Security threads in commemorative banknotes 20, 50 & 100 Yuan (Source: ZSST).

More recently, China has combined innovation with event-led themes. The 2021 CN ¥20 Winter Olympics notes were issued in both paper and polymer, showcasing dual-substrate capability. The banknotes showcase the various optical effects (ColorTrace®, ColorDance®, and Moire amplification) that give the stripes a shimmering vitality, enhancing the snow, lanterns, and the Great Wall depicted on the notes.

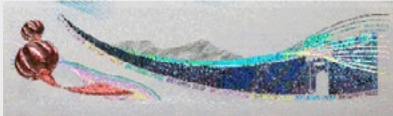


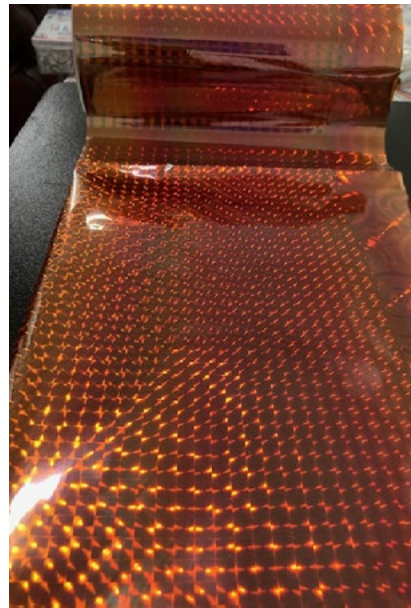
Fig 4: Winter Olympics commemorative banknote, straight and tilted view of banknote stripe.

Since 2024, the annual CN ¥20 zodiac series has established a long-term issuance strategy, positioning commemorative notes as a consistent platform for controlled testing, incremental refinement, design evolution, and optical innovation, thereby shaping authentication habits among the public at large.

Beyond Pigments: Idvac's Vacuum Process Redefines Red Security Holograms

Idvac is a private company based at Manchester Science Park in the UK, founded in 2004 to develop new processes and products for holographic, packaging, and solar window films. It has now developed an innovative process that introduces enhanced design features for security holograms and optical films.

This process enables different shades of bright red colours to be vacuum metallised onto embossed or plain polyester films, creating advanced holographic and other security effects without the use of wet inks, dyes, or pigments.



Commercial red-coloured polyester films are typically produced using methods that involve organic dyes (such as azo dyes) or pigments, such as Iron(III) Oxide (Fe_2O_3), which provide a natural red tone. In conventional manufacturing, dyes or pigments are mixed into molten plastic before being cast into film.

While more environmentally friendly alternatives exist, such as beetroot extract, hibiscus, or red cabbage, they tend to fade in colour over time.

Vacuum-based red films, by contrast, rely on thin-film interference (Fabry-Perot) or absorption to selectively transmit red light. This is achieved through dielectric multi-stack coatings composed of multiple thin layers.

Red-coloured films are widely used in applications such as light filters, solar control windows, coloured holographic stickers, and packaging. In current

holographic sticker production, red-pigmented flakes are applied to films, which are then metallised with aluminium to produce a bright, reflective red finish.

However, conventional dyeing processes involve solvents that are not environmentally friendly and require heat for removal. These solvents can be difficult or costly to recover or dispose of, and residual solvent traces may negatively impact subsequent processes such as vacuum metallisation or printing. Additionally, dye or pigment coatings typically exceed 0.5 microns in thickness, which can limit performance and applications.

Idvac's new innovation addresses these challenges. Plain or embossed polyester films are vacuum metallised in a standard roll-to-roll (R2R) vacuum web metalliser using specialised materials to produce bright red coatings. The process is entirely dry and conducted in a vacuum environment, eliminating the need for dyes, solvents, or pigments. Different shades of red can be precisely controlled by adjusting line speed or evaporation rate.

Key features of the Idvac process:

- Production of multiple shades of bright red colours using a standard R2R vacuum metalliser
- No requirement for equipment modification
- Colour variation ranging from light gold to deep red
- Elimination of dyes and wet surface coatings
- Capability to produce both transparent and opaque red finishes.

This red coating can be used in laminated or hot-stamped security holograms for applications including documents, passports, ID cards, and optical filters.