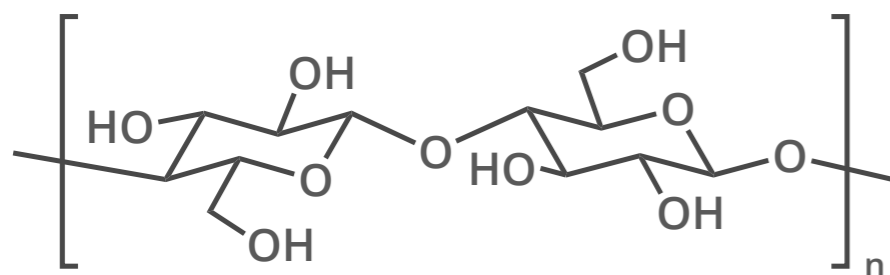


# THE CHEMISTRY OF PAPER AND POLYMER BANKNOTES

The UK recently began its introduction of polymer bank notes. Here we look at the chemistry used in bank notes and their security features.

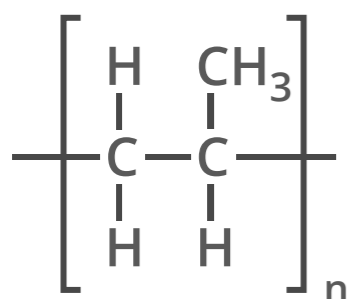
## THE SUBSTRATES



CELLULOSE

Most paper banknotes are actually not made from paper, but from around 80% cotton paper.

Cotton is made up of the natural polymer cellulose – so in a way, paper banknotes are actually polymer banknotes too!



POLYPROPYLENE

Transparent material, but later made opaque with white ink.

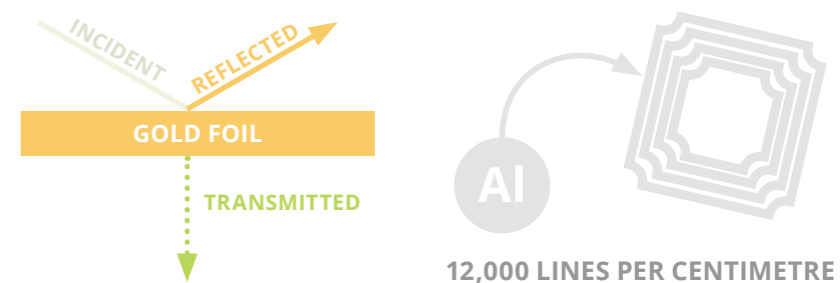
Newer polymer notes are usually made from biaxially oriented polypropylene (BOPP). 'Biaxially oriented' refers to the manner in which it is stretched during production, increasing its strength and transparency. White pigment, inks, and varnish are later applied to the notes.



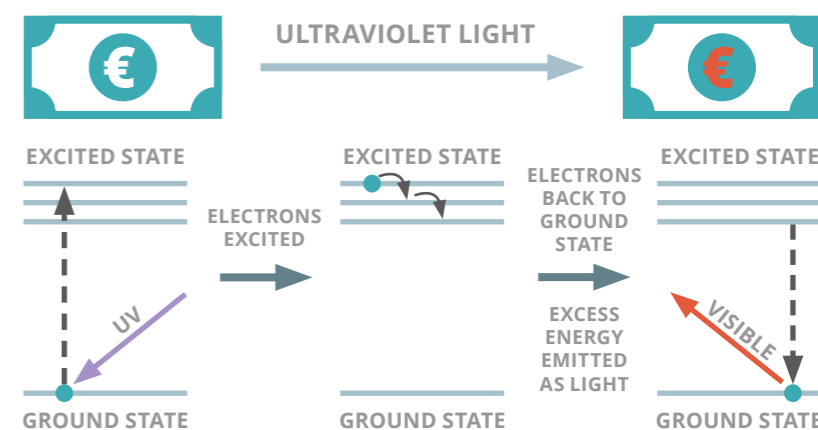
## POLYMER BENEFITS

- SECURE** Harder to counterfeit than paper banknotes – more security features.
- CLEANER** Waterproof and do not get dirty easily, unlike paper banknotes.
- DURABLE** Estimated to last 2.5 times longer on average than paper banknotes.
- GREENER** Unlike paper banknotes, polymer notes can be recycled after use.

## SECURITY MEASURES



OVDs (Optically Variable Devices) are parts of the note that change their appearance when something external to the note changes, such as the angle it's being viewed at. Thin films of gold appear green in transmitted light, but gold in reflected light. Thin patterned lines coated with aluminium can also provide various colours.



Anti-counterfeiting compounds that fluoresce when placed under ultraviolet light are also a common security device. Euro notes use compounds of lanthanide elements to accomplish this, including those of Europium.