

Low Cost Flexible Paper-Like Displays Based on Nanostructured Films

François Pichot
NTera Ltd.

Grange Road, Rathfarnham Dublin 16, Ireland.

The product/technology gap between expensive high information content (HIC) electronic displays such as OLED, Plasma and LCD, and ultra low-cost static graphic art displays such as printed paper and advertisement billboards is narrowing thanks to the development of novel electronic materials, higher performance flexible transparent substrates and a commercial demand for products with the flexibility and readability of paper and changeable content. While on the one hand, complex HIC displays are limited to rigid glass substrates for practicality reasons, at the other end of the spectrum, paper and plastic are the accepted mechanical support for the lower-end “displays”.

NanoChromics™ is a novel reflective display technology based on nanostructured organic/inorganic hybrids that closely mimics, with exceptional readability and colour brightness, the appearance of ink on paper. Numerous display applications ranging from small-sized electronic paper devices to large-size Public Information Signage are being pursued. In addition to the optoelectronic performance of our technology, its main strength lies in the fact that all the materials it comprises are printed from inks, lowering considerably the manufacturing costs compared to traditional displays.

Recent achievements at NTERA in the area of nanostructured films processing have allowed us to demonstrate our technology on flexible plastic substrates. Bistable Point-of-Sale demonstrators with contrast ratio superior to 5, switching speeds below 0.5 seconds when operated at voltages below 1.5 volts have been constructed. The combination of NanoChromics™ paper-like qualities, plastic flexibility and cost-effectiveness of the manufacturing scheme opens new commercial opportunities allowing us to bridge the aforementioned technological gap.

The challenges associated with plastic substrates and the performance characteristics of the flexible displays will be discussed.

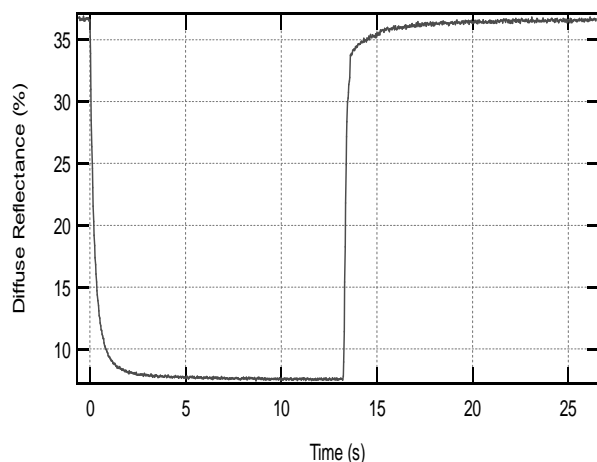


Figure 1: On/Off Diffuse Reflectance of a NanoChromics™ device based on nanostructured films processed below 150°C and operated at 0/1.3 Volt.