

A NEW LIGHT-PRINTABLE AND REWRITABLE PAPER USING NANOPARTICLES

A team of researchers at Shandong University in China, the University of California, Riverside, and Lawrence Berkeley National Laboratory in United States have developed a new way to print on paper using light. The invention uses the colour-changing chemistry of nanoparticles, which can be applied via a thin coating on a variety of surfaces, including ordinary paper.

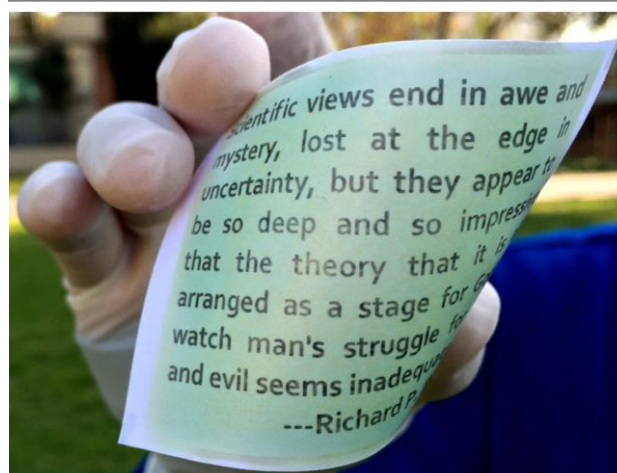
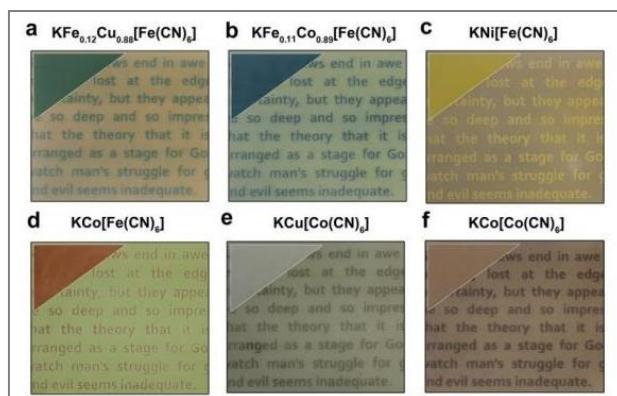
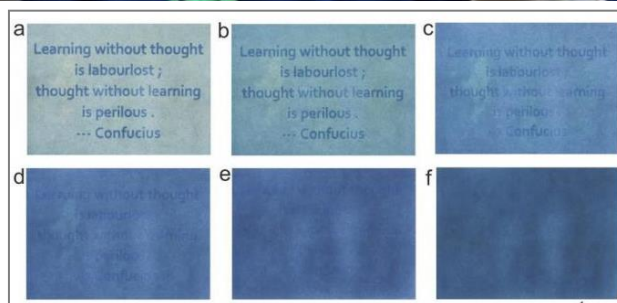
This paper is useful when printed information is needed only for a short time and has the same feel and appearance of the conventional paper. The rewritable paper has many practical applications involving temporary information recording and reading, such as magazines, posters, notepads, writing easels, product life indicators, oxygen sensors, and rewritable labels for various applications.

The innovative process produces an ink-free and light-printable paper which can be easily printed thanks to the color-changing chemistry of nanoparticles and erased repeatedly. The invention uses the colour-changing chemistry of two types of nanoparticles which are applied on a variety of surfaces, like glass or film, including ordinary paper, as demonstrated by the [Yin Lab, UC Riverside](#) at the University of California.

Through a chemical reaction the letters and patterns react in response to UV-light. The printing lasts at least five days before it slowly begins fading in blue over time. It is a new way to print on paper using light (by UV rays) with the possibility to erase the written parts and reuse the paper up to more than 80 times, with no significant loss in contrast and resolution, making it cost-effective and environmentally friendly compared to ink-based printing.

The innovative process is still a prototype but since the coating can also be applied to the surface of conventional paper by simple processes such as soaking or spraying, the researchers expect the technology becomes affordable enough once made on a commercial scale.

According to some surveys, 90 percent of all information in businesses today is retained on paper, even though the bulk of this printed paper is discarded after just one-time use. This high resolution technique can be easily used from newspapers to labels. The reduced waste of



inkjet cartridges has a positive impact on the environmental costs of recycling and disposing. This invention will have a direct effect in reducing costs and advantages on deforestation: 40% of waste reduction in US discarded paper with 68 million trees cut down to keep office stationeries, without mentioning chemical pollution to air, water and land. It definitely represents an attractive alternative to regular paper in meeting the increasing global needs for resource sustainability and environmental conservation.

The next step of the research team is to construct a laser printer to work with this rewritable paper to enable fast printing and they are also looking into effective methods for realizing full-color printing.

In 2016 the innovation was awarded by the [Nano-Micro Letters Journal Prize](#), in partnership with the Nature Research Society (NRS), as research of excellence in the field of nano and micro science.

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