Write with heat, cool and then repeat with rewritable paper

December 5 2018

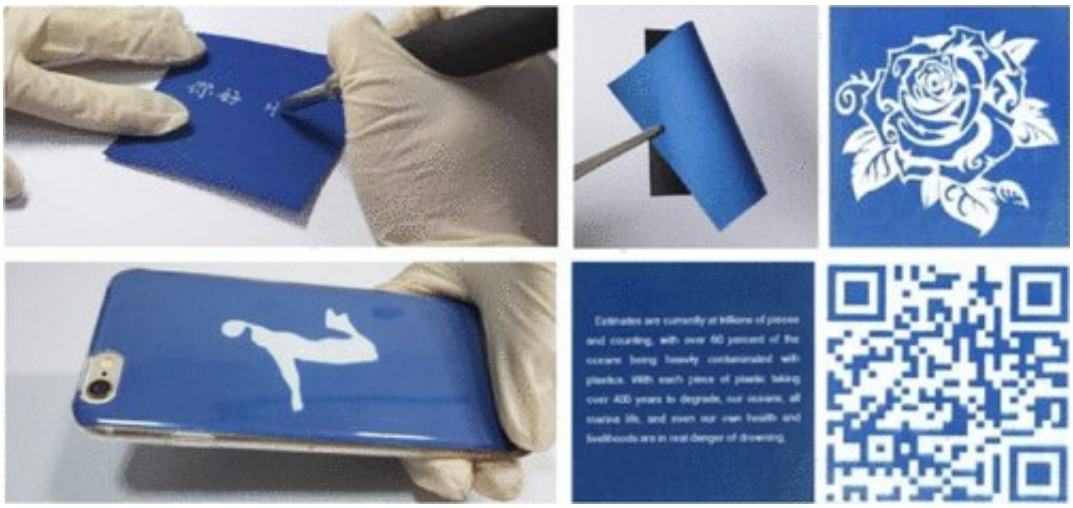
The image on this cell phone case can change because it was made with rewritable paper. Credit: American Chemical Society

Even in this digital age, paper is still everywhere. Often, printed materials get used once and are then discarded, creating waste and potentially pollution. Now, scientists report in *ACS Applied Materials & Interfaces* the development of an easy-to-make "rewritable" paper that can be drawn or printed on over and over again. The messages can last

more than half a year, compared to other rewritable papers whose messages fade after a few days or a few months.

The idea for rewritable paper isn't new, with several research groups pursuing different development strategies over the past few decades. But many of these approaches have drawbacks, such as complex fabrication, chemistry that relies on ultraviolet light to erase the writing or a constant need for energy to maintain the document. To overcome these limitations, Luzhuo Chen and colleagues wanted to develop a simple method for making long-lasting rewritable paper that can be wiped clean simply by changing the temperature.

The new material consisted of three layers in a sandwich-like structure. The researchers painted one side of a piece of paper with a blue dye that becomes colorless upon heating, just like the t-shirts popular in the 1990s that changed color when they were touched with a warm hand. Then, the other side of the paper was coated with a black toner layer that produces heat upon excitation with light. Using a "pen" that applies heat, a thermal printer or a source of near-infrared light, the team created images and words that remained legible for more than six months. They also produced a rewritable cell phone case. To reset the paper, the researchers cooled it down to 14 F. This process could be repeated more than 100 times.



Credit: American Chemical Society

More information: Luzhuo Chen et al. Long-Lasting and Easy-to-Use Rewritable Paper Fabricated by Printing Technology, *ACS Applied Materials & Interfaces* (2018). DOI: 10.1021/acsami.8b14625

Provided by American Chemical Society