Reusable Paper Preparation and Printing Device Design Based on the Ultraviolet Photochromic Principle

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The traditional papermaking industry consumes enormous energy and causes serious pollution. In addition, a lot of paper is wasted. How can be the paper reusable? In this study, a new type of reusable paper was invented. When controlled UV light shines on its surface, the photochromic materials on its surface will set off a photochemical redox reaction. The part irradiated will change its color, forming characters. In this way, the UV light plays the role "pen" during in the printing process. When such paper is exposed to air for a period of time, the photochromic material will react with the oxygen in the air and gradually loses its color. Then the characters will disappear from the paper. So, such paper can be reused. In order to test the properties of the paper, corresponding printing device has also been designed. When the paper is being printed or is written on directly with laser pointer, it will change its color, with characters appearing on it. Such paper features clear writing and high resolution. When it is exposed to air for 10 to 50 hours, the texts and pictures on it will disappear, enabling it to be used again. It can even retain good printing and writing effects after used for more than dozens of times. Today, resources have become increasingly scarce and our environment is worsening. Such new paper is expected to become a new choice and meet people's growing need of paper, which accords with globe’s goal and plan of sustainable development. If it can be widely used, the papermaking and printer manufacturing industry might be revolutionized.