# DYE DESTRUCTION PROCESS

## PROCESS

Dye destruction has been used for making prints from colour transparencies or negatives [6, 7].

Silver dye-bleach uses a chromolytic process to reproduce the original image colour. The photographic material, contains the full concentration of the image dyes - the red-sensitive layer contains cyan azo dye, the green-sensitive layer contains magenta azo dye, and the blue-sensitive layer contains yellow azo dye - required to reproduce black [5, 3]. The image is obtained by varying the concentration of the dye from point to point, bleaching it as a function of the silver photographic image [8].

In the first step of the process, the exposed silver halide is developed into a metallic silver image by a conventional black-and-white developer. The second step is a bleaching bath, which forms the image: the dyes are destroyed, in the presence of halogen acids, depending on how much light is received during exposure in the course of development. This procedure leads to a positive picture because in areas with white exposure all dyes are bleached and the layer becomes transparent, areas with no exposure maintain the full amount of all original dyes and are consequently black. The third step requires the oxidation of any excess silver that has not been used for dye bleaching. The last step dissolves the silver compounds and the reaction products of dye bleaching [5, 8].

## HISTORY

The first suggestion of a dye destruction process was made by Carl Schinzel in 1905. He was able to destroy the dyes by an oxidation reaction using hydrogen peroxide. Three years after, reductive silver dye bleaching was invented by Christensen, which used strong reducing agents to make the reaction. This last invention, however, did not lead to commercial products [9].

The first silver dye bleach system available for practical use was Gasparcolor and it was created by Bela Gaspar in 1930. It was a three-colour multi-layer monopack film coated with a cyan layer on one side and two layers dyed magenta and yellow on the other side. As a consequence of this arrangement, the process required b/w separation records of the red, blue and green light, either produced by a beam-splitter camera or by successive photographs taken through the corresponding filters. Gasparcolor materials contained water-soluble dyes in the three layers of the emulsion, which were destroyed in a controlled way in relation to the amount of developed silver present at a specific point. After development, the dyes were bleached by hydrogen bromide or acid thiourea, the silver serving as a local catalyst for the reaction. Since the dyes are destroyed in the exposed areas Gasparcolor is a reversal process [10].

Before the Second World War, Gaspar had to flee from Germany, he established in London where he could not convince the producers in the US to adopt this process. In the late 1950s, the principle saw revived by Ciba-Geigy and distributed as Cibachrome [10].

Cibachrome was introduced as a print service to print amateur photographs in Switzerland in 1963, but only for a brief time. It was reintroduced in 1967 for professional use and in 1969 as a transparency material [3]. These early products were characterized by a cellulose triacetate support and provided a higher quality of colour reproduction and image stability. Despite this, the low speeds and high prices of the materials resulted in limited use [9].

Materials introduced in 1980 were produced on an opaque or transparent polyester base or resin-coated paper support. In 1989, Ciba sold Ilford to the International Paper Corporation of America and the name of the product was changed from Cibachrome to Ilfochrome in 1991. The resin-coated paper was discontinued in 2005 and all Ilfochrome production was discontinued in 2012 [6].

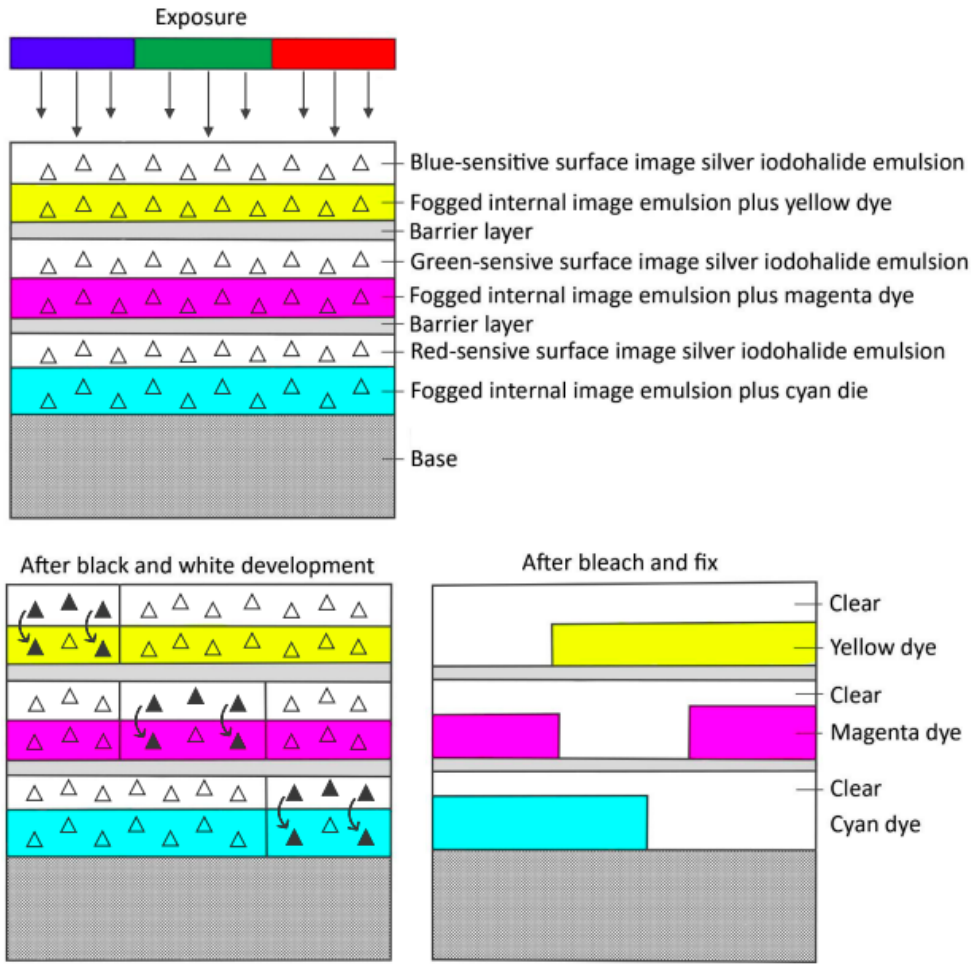


***Fig. 1*** *Diagrammatic representation of the phases of the silver dye bleach process.*


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