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Film Materials, Formats and Processes

Reto Kromer • AV Preservation by reto.ch

On the Materiality of Audio-Visual Heritage
Elías Querejeta Zine Eskola
Donostia (San Sebastián), Spain
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Observations

- 16 mm
- black and white
- reversal
- silent
- cellulose diacetate

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Common Film Formats

professional formats

- 35 mm, Super 16

universal format

- 16 mm

amateur formats

- 9.5 mm, 8 mm, Super 8

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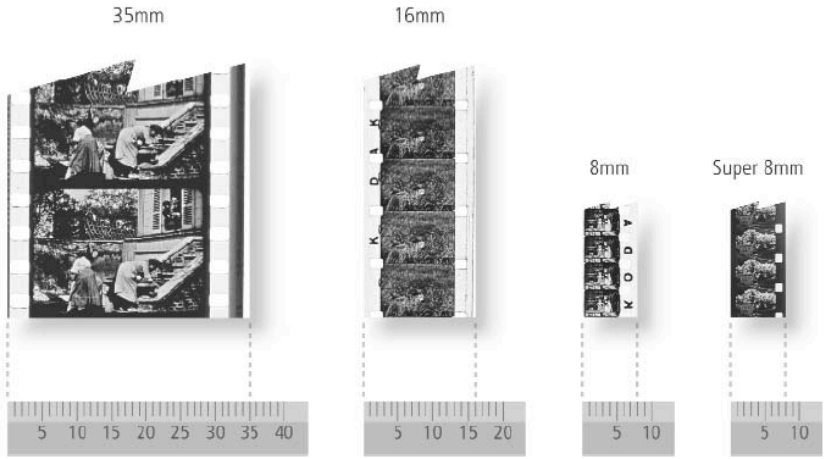

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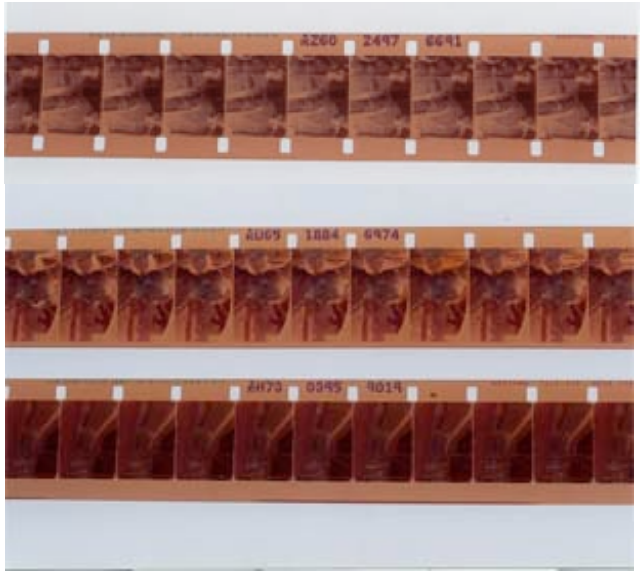

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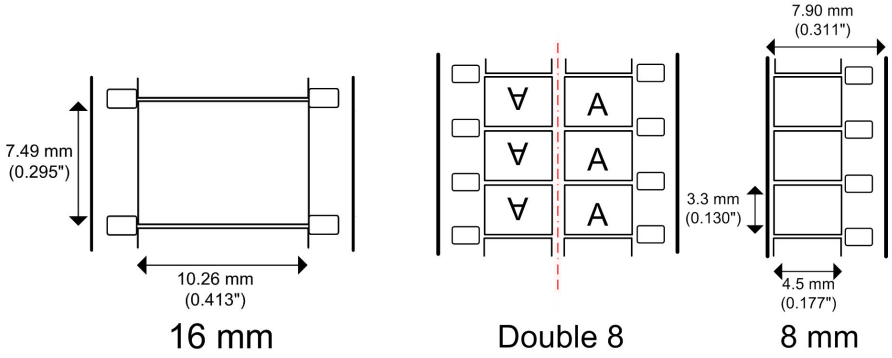

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Common Magnetic Formats

audio

- **2″, 1″, 1/2″, 1/4″**

cinema

- **35 mm, 17.5 mm, 16 mm, 8 mm**

video

- **2″, 1″, 3/4″, 1/2″**

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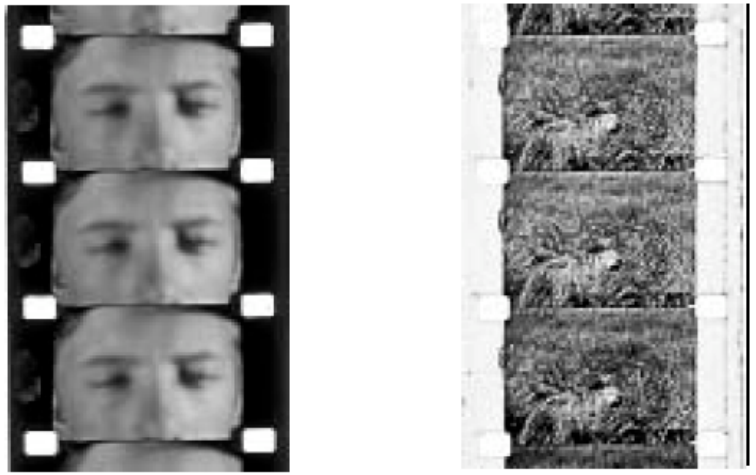
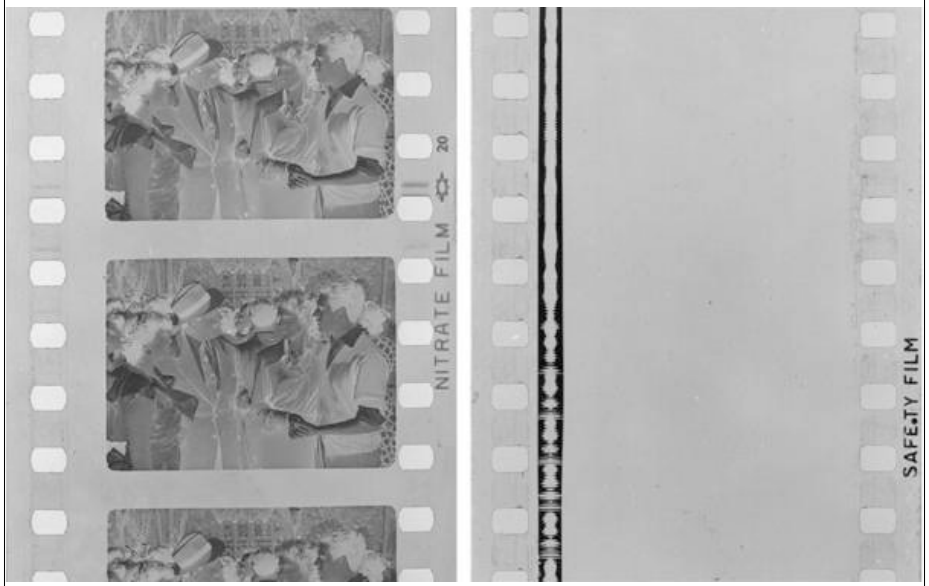
Film Polarity

- negative/positive
- reversal





"Silent Film" Sound

- musical improvisation
- cue sheet
- "Kinemathek"
- score
- film narrator or Benshi
- voices from behind the screen
- sound effects
- sound on disc or tape cassette

Sound Film

comopt = composite optical sound print (variable density or variable area)

commag = composite print with magnetic stripe

sepmag = magnetic sound only

sepopt = optical sound only print

magopt = both optical and magnetic sound on one film

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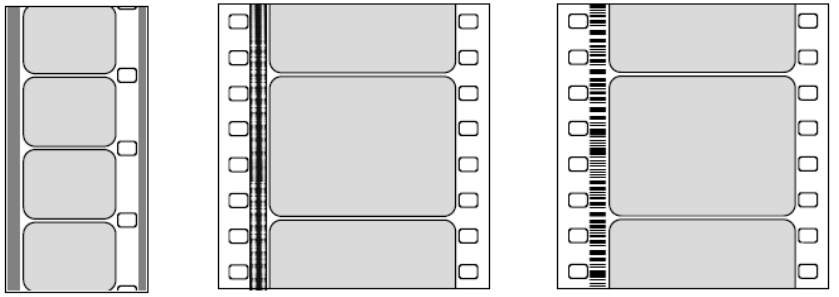

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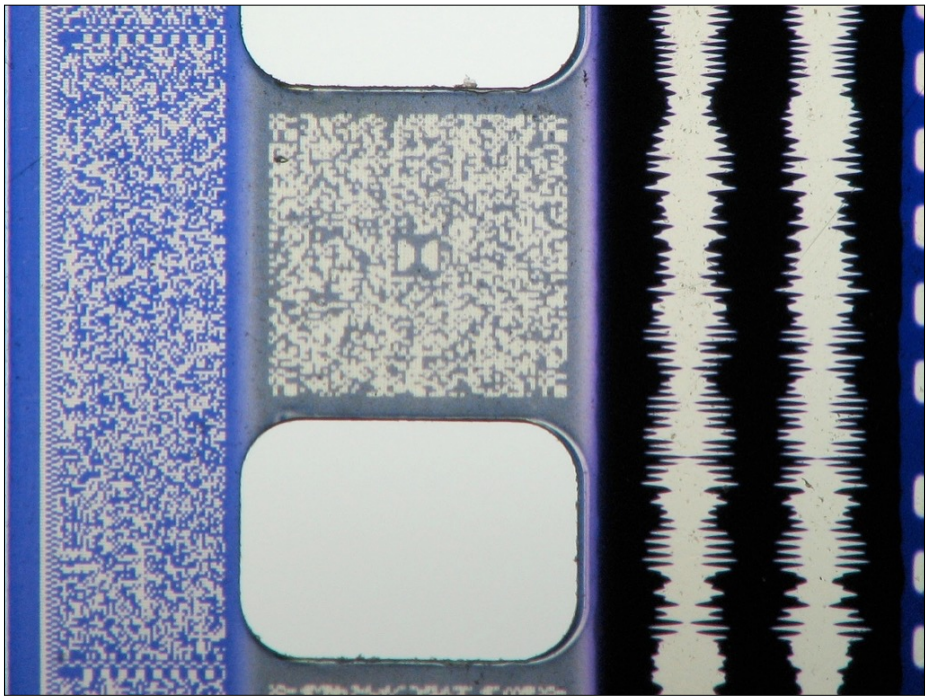

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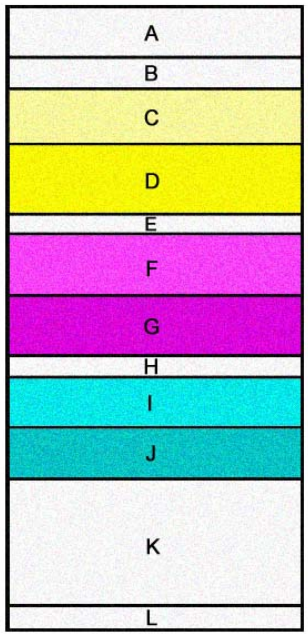
Sound Film Production

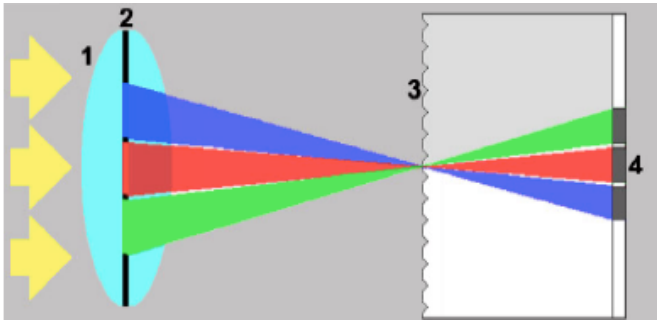
image	sound
photochemical	photochemical
photochemical	magnetic
photochemical	digital
photochemical + digital	digital
digital	digital

Flavours of Film Colour

- hand coloured
- stencil
- tinting
- tonight
- additive colour
- subtractive colour



lenticular film

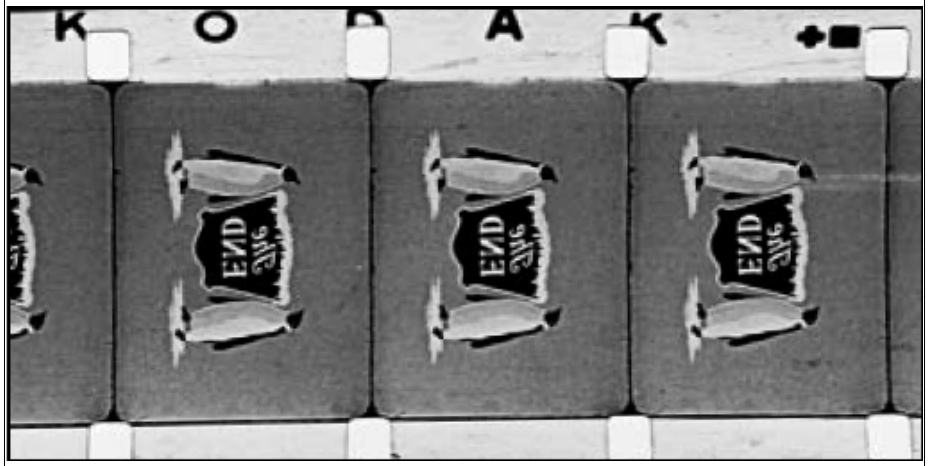


Dufaycolor

Other Information

- raw stock: manufacturer and type
- type of camera
- image format
- wind (winding A; winding B)
- generation/type of element: camera original, print, internegative, interpositive, dupe neg, fine grain; A and B rolls (sometimes more)
- Filmographic data in titles and credits; people, places, etc.

Edge code



EASTMAN KODAK DATE CODE CHART					
1922	1942	1962	● ■	1982	● ■ X
1923	1943	1963	● ▲	1983	X ▲ X
1924	1944	1964	▲ ■	1984	▲ ■ ▲
1925	1945	1965	■ ●	1985	■ ● ▲
1926	1946	1966	▲ ●	1986	▲ ● ▲
1927	1947	1967	■ ▲	1987	■ ▲ ▲
1928	1948	1968*	● ● ●	1988	+ + ▲
1929	1949	1969	+	1989	X + ▲
1930	1950	1970	▲ +	1990	▲ + ▲
1931	1951	1971	● +	1991	X + X
1932	1952	1972	■ +	1992	■ + ▲
1933	1953	1973	+ ▲	1993	+ ▲ ▲

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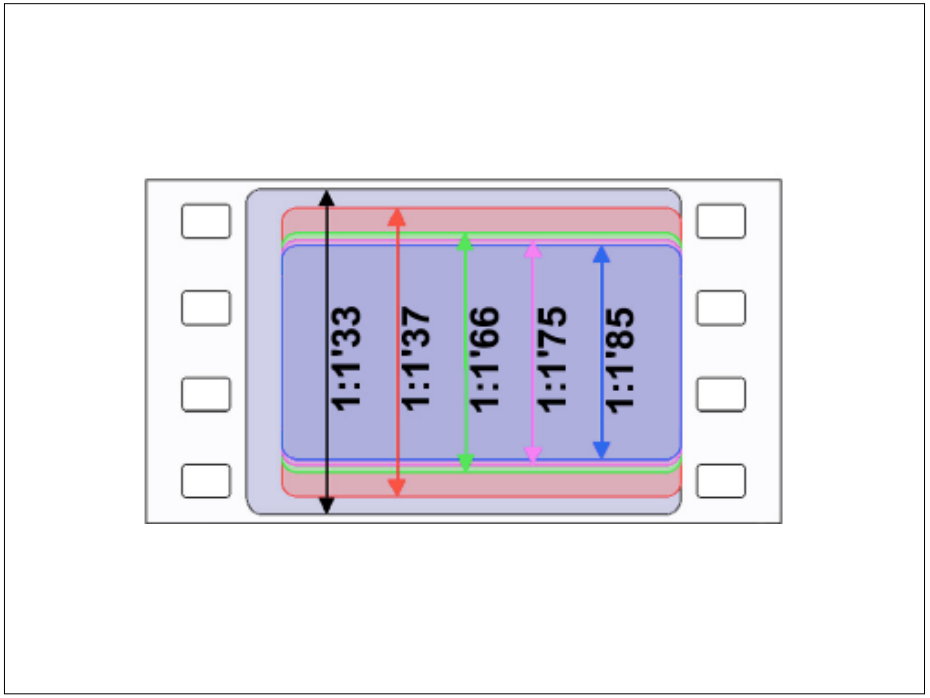

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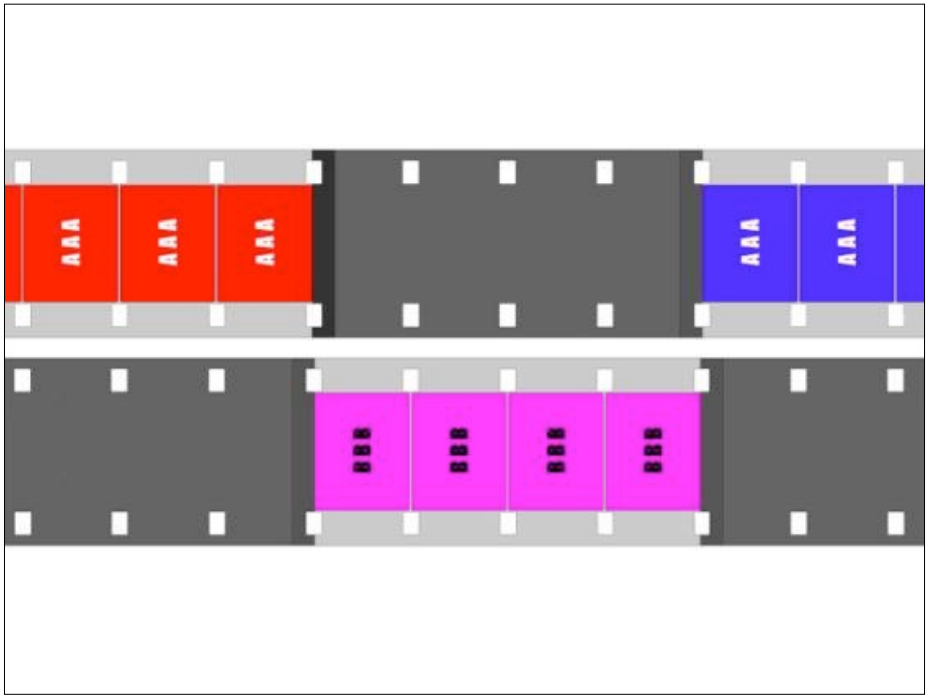

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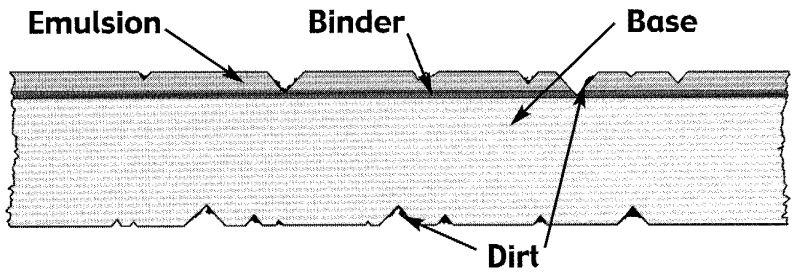
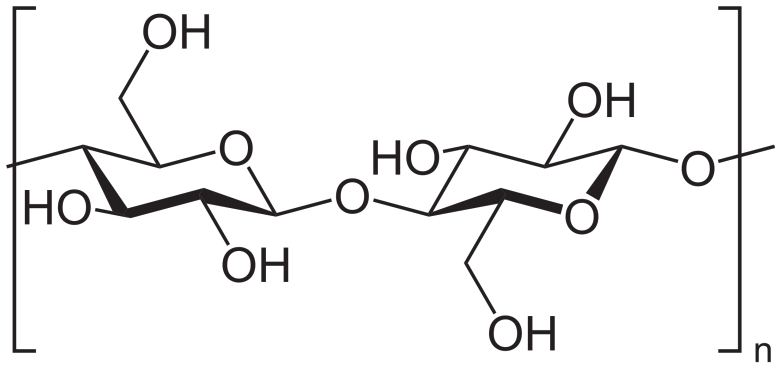
Cross Section



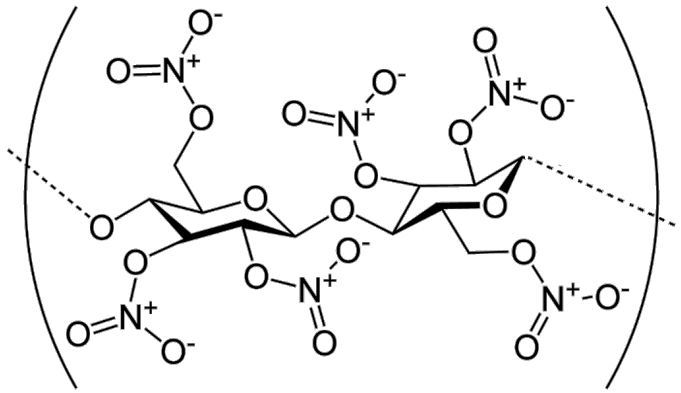
Film Base

- cellulose nitrate
- cellulose diacetate
- cellulose triacetate
- polyester

Cellulose



Nitrocellulose



Nitrocellulose

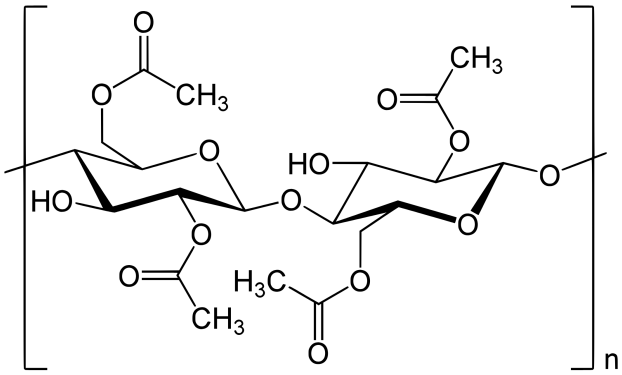
advantages:

- excellent transparency
- best flexibility

disadvantages:

- highly flammable
- out-gasses nitric acid

Cellulose Acetate



Cellulose Diacetate

advantages:

- lower flammability than nitrate (but still flammable)

disadvantages:

- becomes brittle at low temperatures
- pronounced shrinkage in dry conditions
- out-gasses acetic acid ("vinegar syndrome")

Cellulose Triacetate

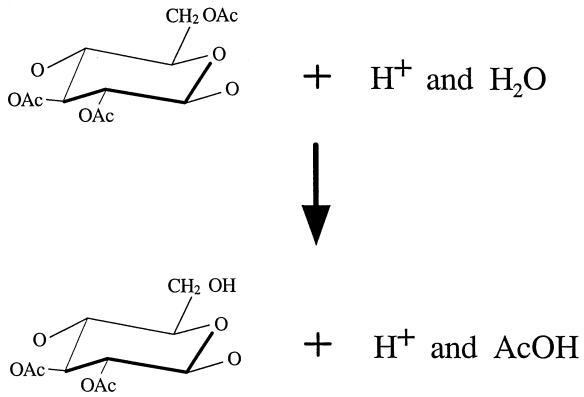
advantages:

- low flammability
- easily cement spliced

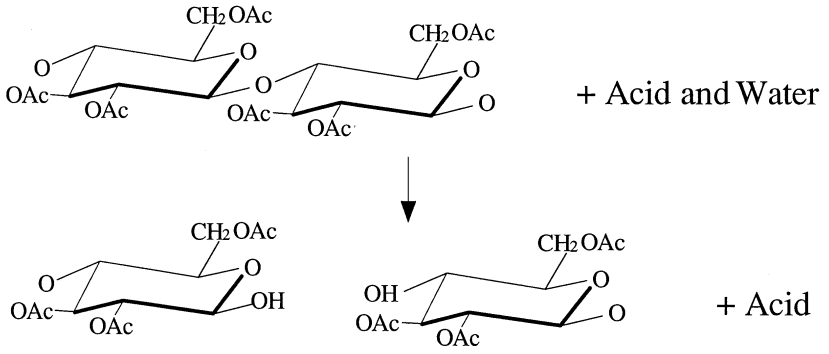
disadvantages:

- out-gasses acetic acid ("vinegar syndrome")

Acid Catalysed Hydrolysis



Glycosic Clevage by Hydrolysis



Polyester

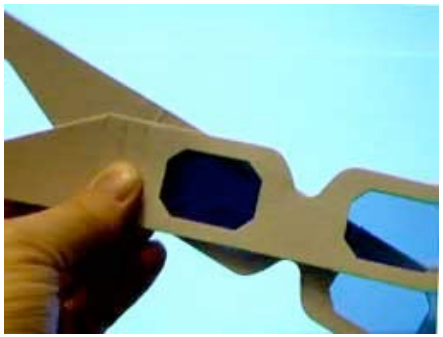
advantages

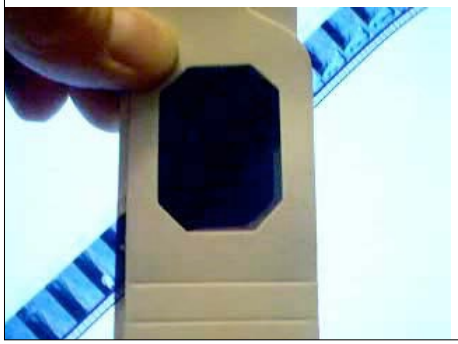
- strongest and most stable carrier
- manufactured without solvents
- does not shrink

disadvantages

- static charge attracts dust
- can only be spliced ultrasonically

base	since	main uses (Kodak)
Nitrate	1869	for still and cinefilm from 1888 until 1951
Diacetate	1909	• from 1915 until 1937 for home cinema distribution of cinema classics • from 1923 until 1948 for amateur films
Triacetate	1936	• since 1948 for film und magnetic tape • replaced nitriate in 1951 for projection prints • still used today in most camera negatives
Polyester	1940s	• since 1955 for magnetic tape • occasionally for Super 8 (Fuji) • 1990s for 35 and 16mm prints and duplicates





Bibliography

The Film Preservation Guide. The Basics for Archives, Libraries and Museums. National Film Preservation Foundation, San Francisco CA 2004

www.filmpreservation.org

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