

Development and distortion

EM WORKSHOP NAGOYA

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From where "distortion"
come?

At what stages
are key points to
avoid distortion?

Pouring ?

Drying ?

Developing ?

Drying ?

will be discussed

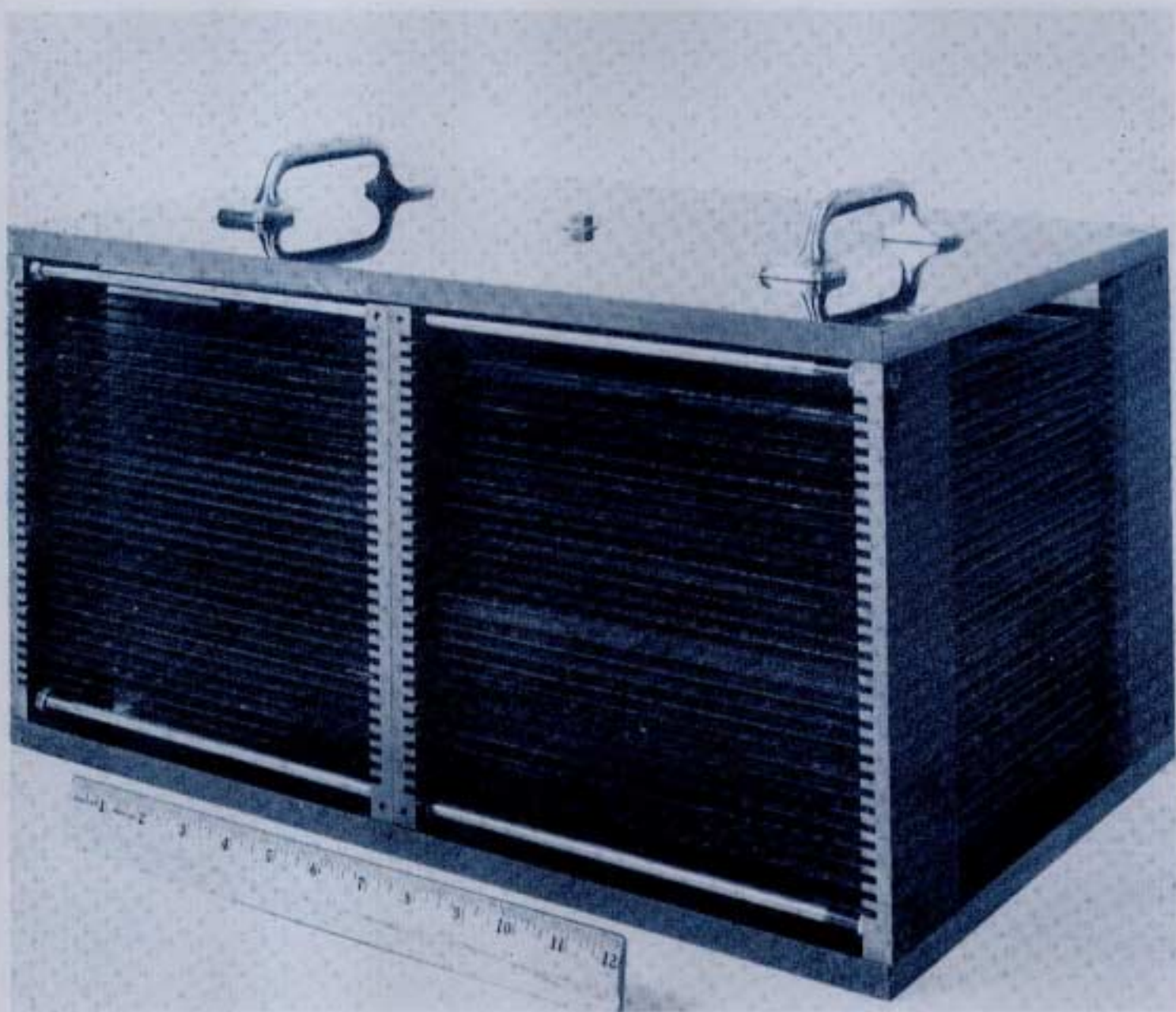


FIG. 5.4.1. Rack in which pellicles mounted on glass are placed for processing (IDLRL).



Thickness - Distortion

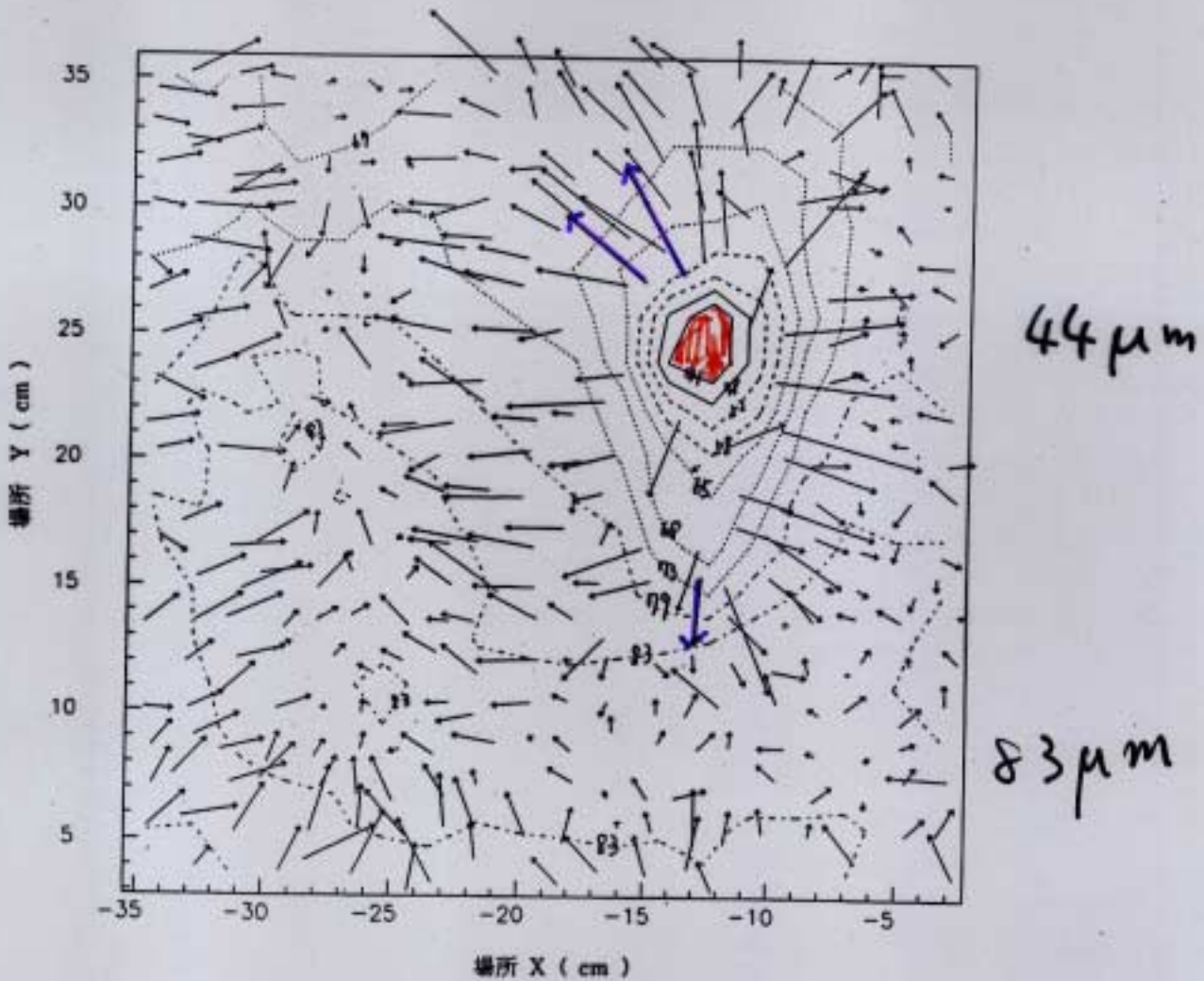
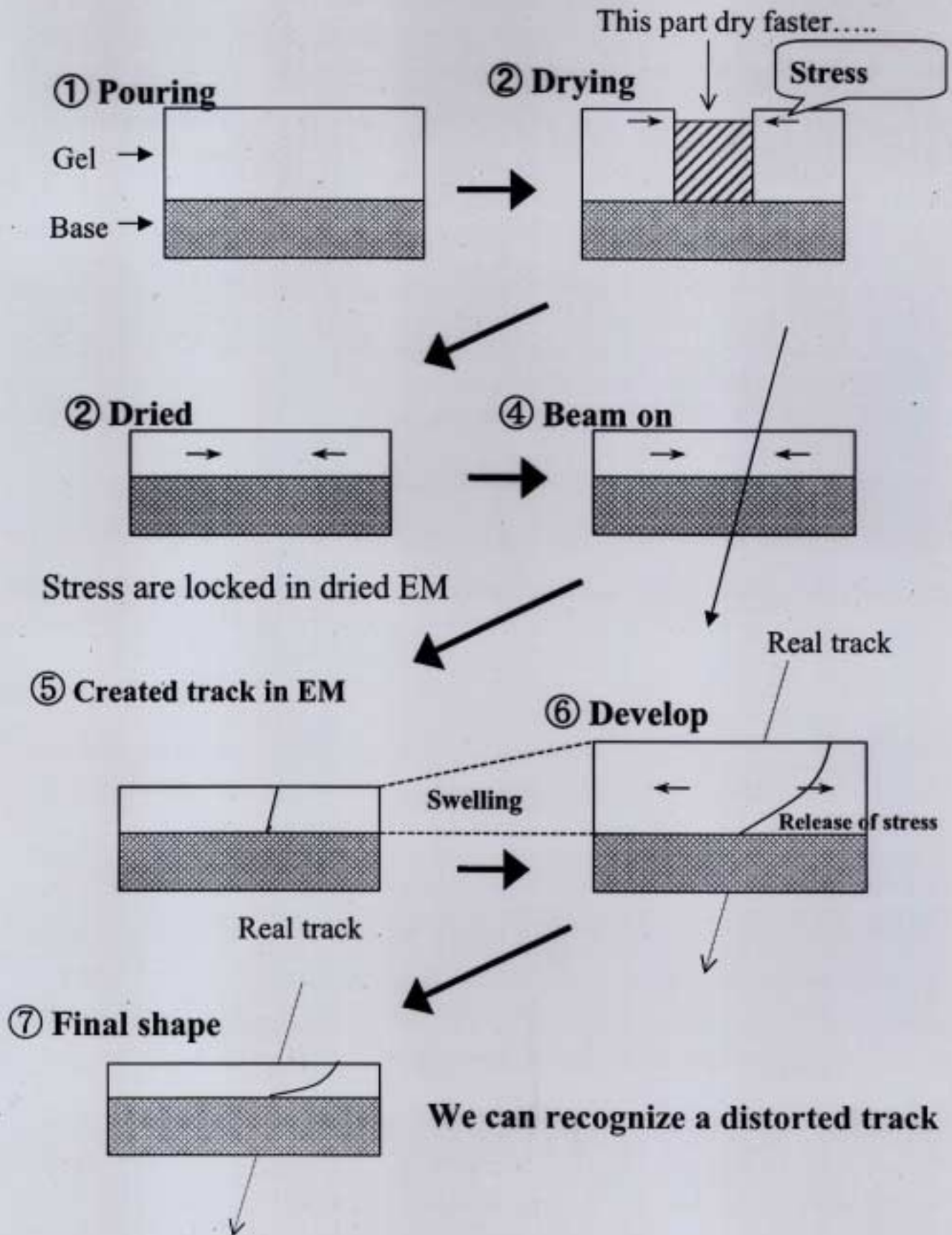


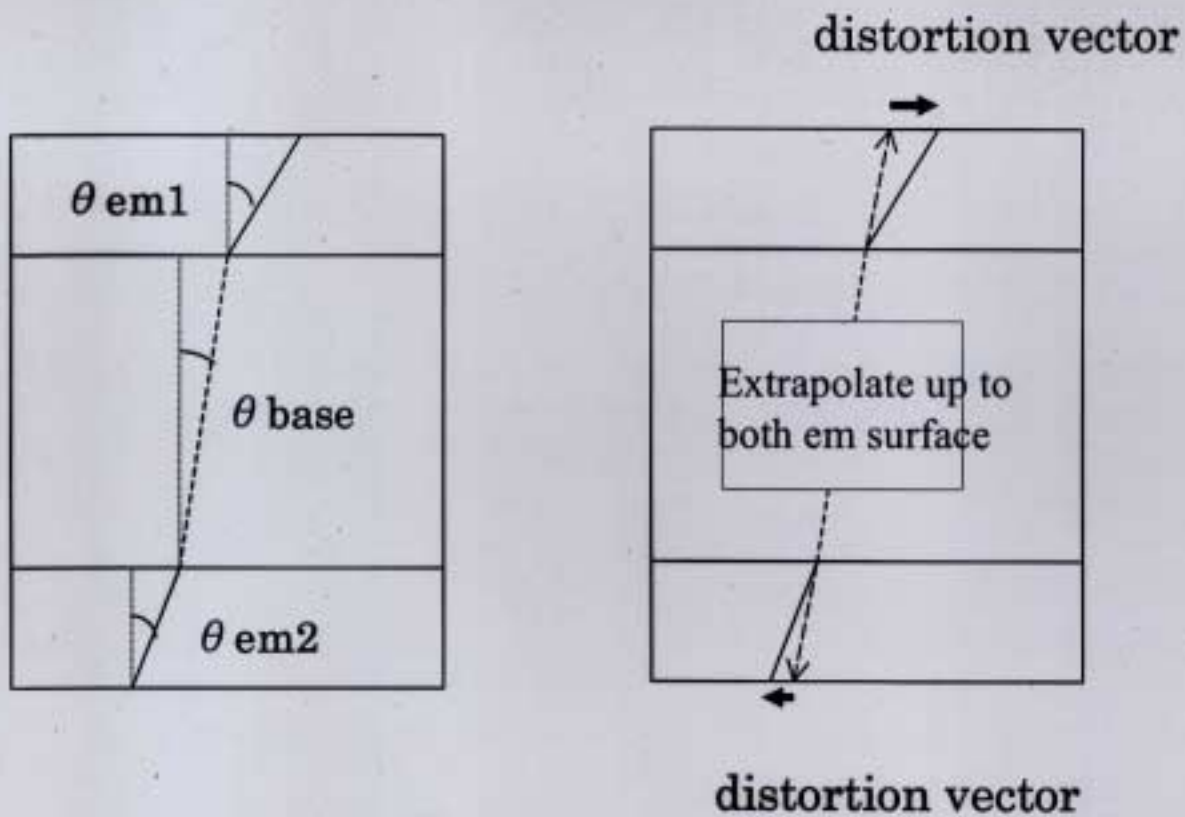
図 4.11: 厚さと飛跡の受ける歪の相関

図 4.11: 乳剤層の厚さのばらつきと飛跡の受ける歪の相関。乳剤層の厚さは等高線で示してある。歪のベクトルは同様の定義である。図では右上の方に厚さ $40\mu\text{m}$ ほどのくぼみがある。そのくぼみの中心から外に向かって放射状に歪ベクトルが見え、厚さと歪の相関が示されている。

Mechanism of Distortion



Definition of distortion vector



Distortion vector $(\Delta \theta 1, \Delta \theta 2)$

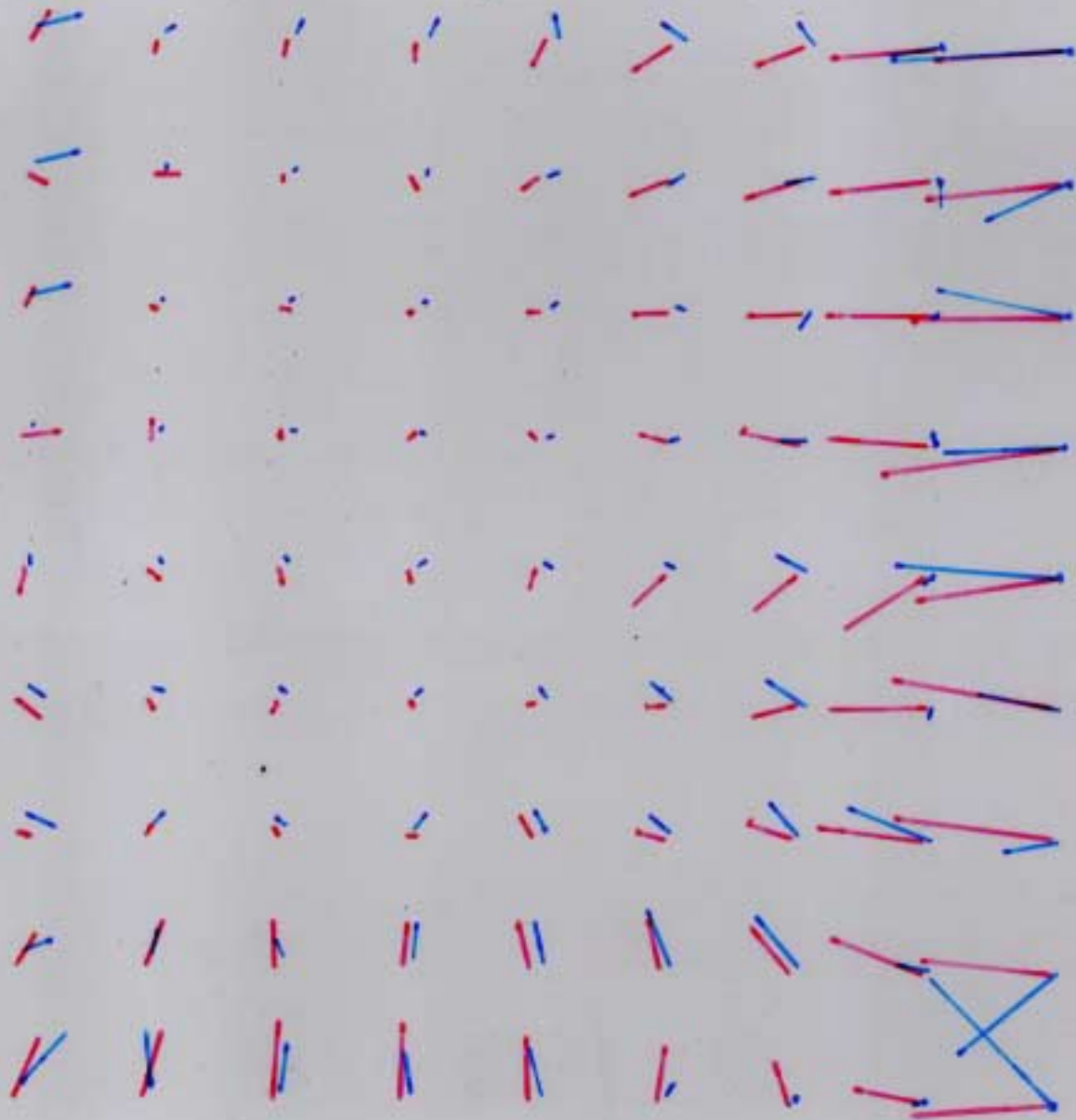
$\Delta \theta 1 = \theta_{e1} - \theta_b$ (X and Y projection)

$\Delta \theta 2 = \theta_{e2} - \theta_b$ (X and Y projection)

Distortion vector

- coated (330 μ both side) Em -

— Frontside
— Backside



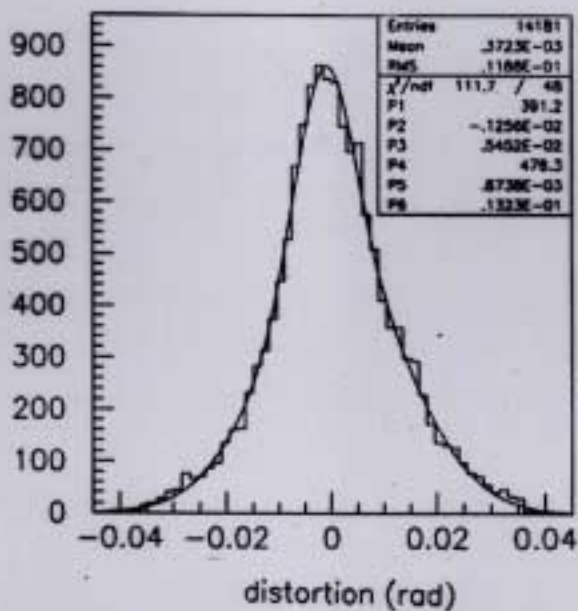
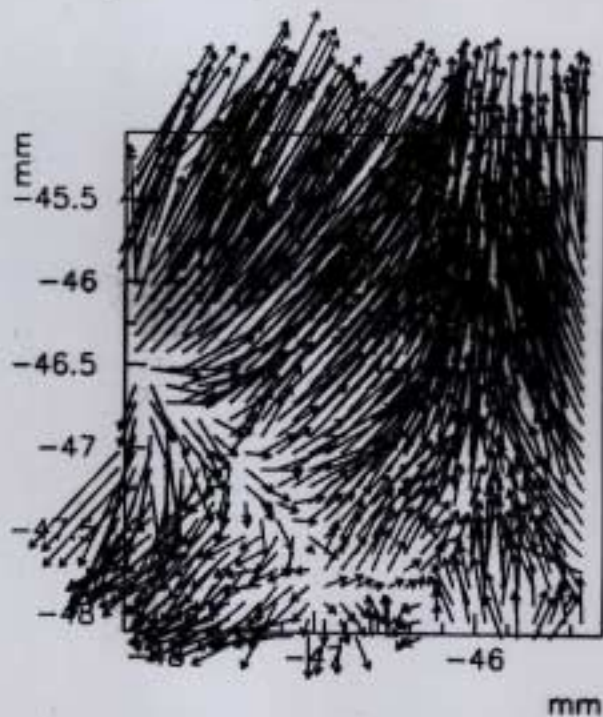
3 cm

$\langle \rangle \approx 70 \text{ mrad}$ $\longleftrightarrow 50 \mu\text{m} (150 \text{ mrad})$

Distortion by conventional development

Processed amidol developer

Map of distortion vector

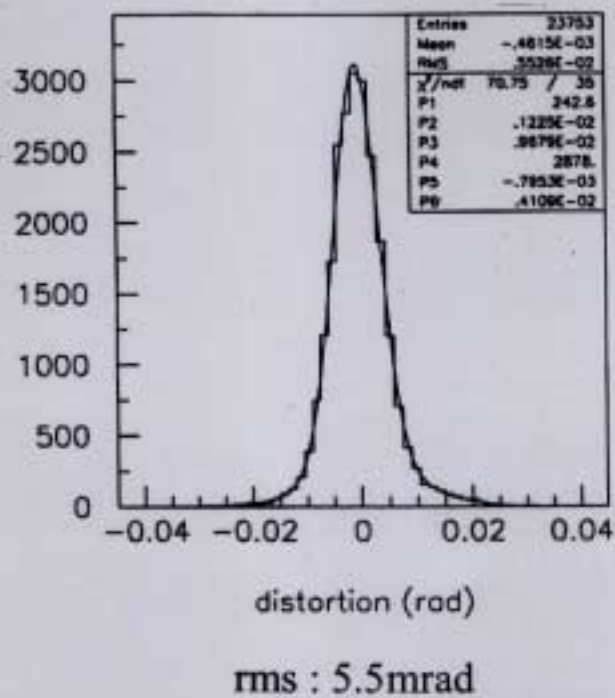
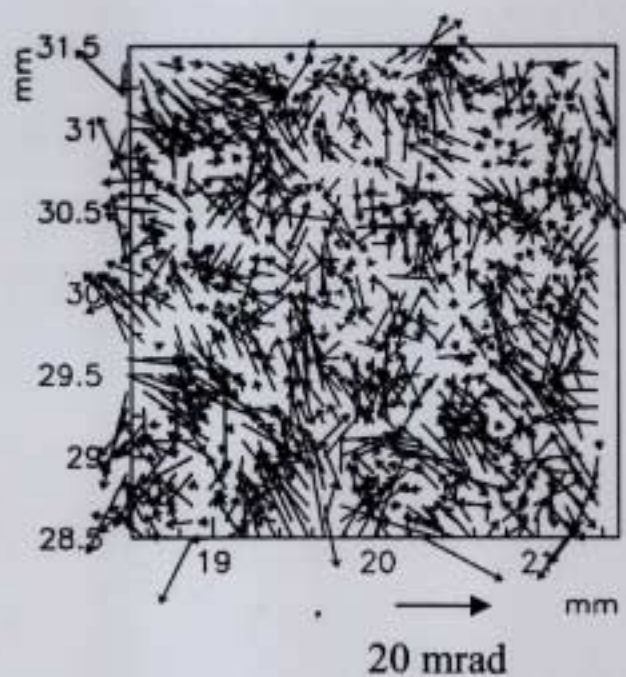


→
20 mrad

rms
~ 11.9 mrad

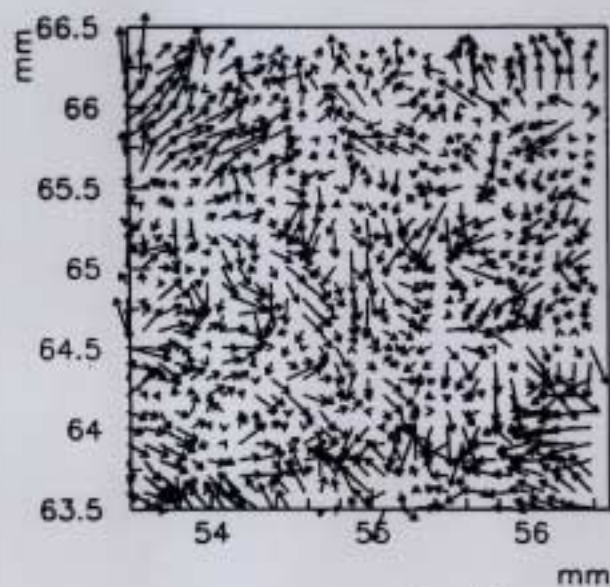
Distortion by less swelling development

amidol developer added sulfate

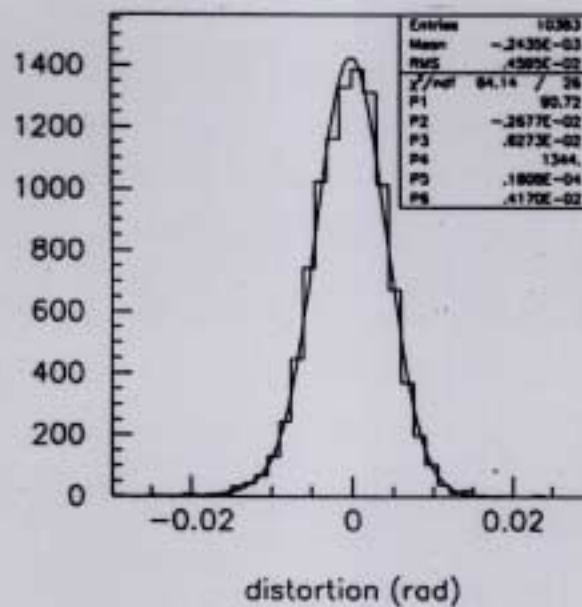


Distortion of Emulsion film

Present type with XAA developer

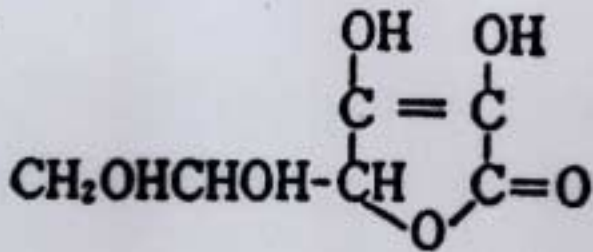


→
20 mrad



rms : 4.6 mrad

Main agent of developer



アスコルビン酸

ascorbic acid

pH ~ 9.7

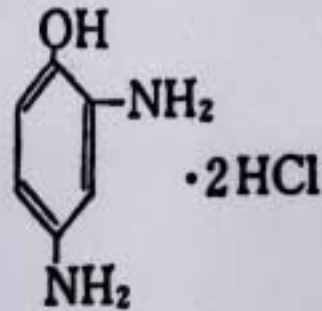
Efficacy time

> one month

Delivery

condensed liquid

Fuji XAA



ジアミノフェノール
塩酸塩(アミドール)

amidol

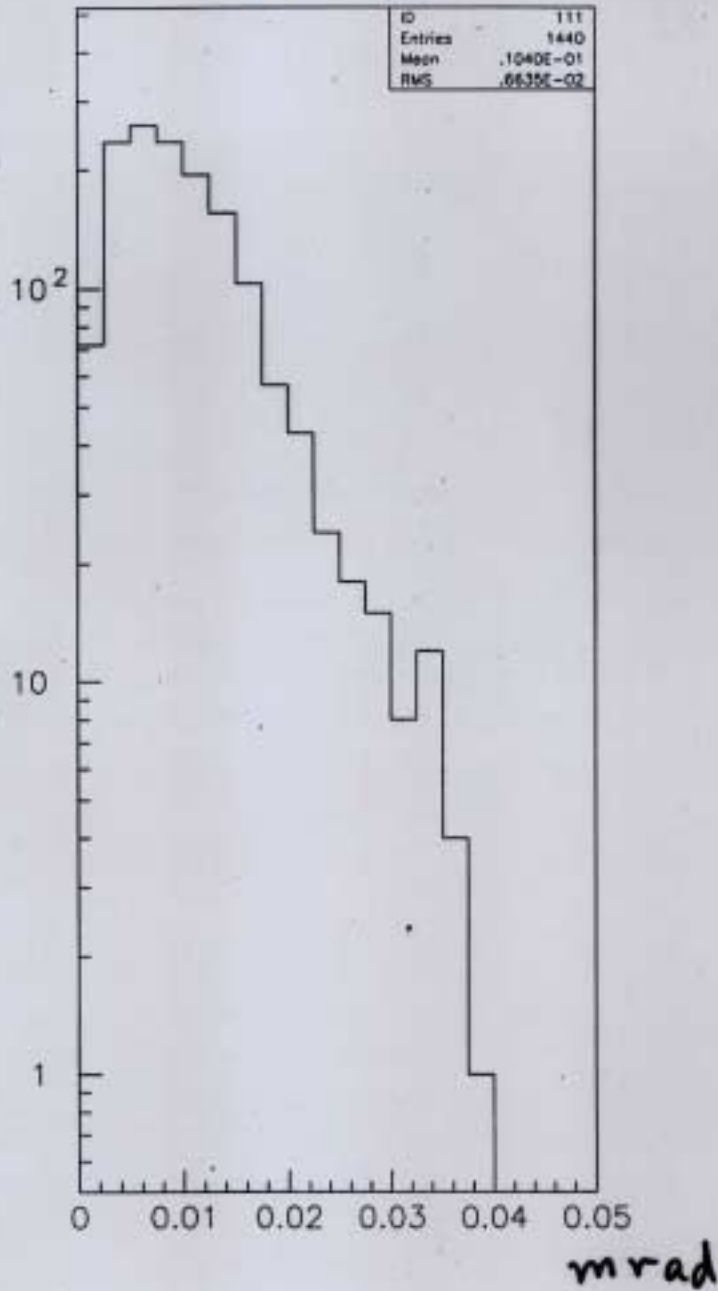
pH ~ 6.7

< one day

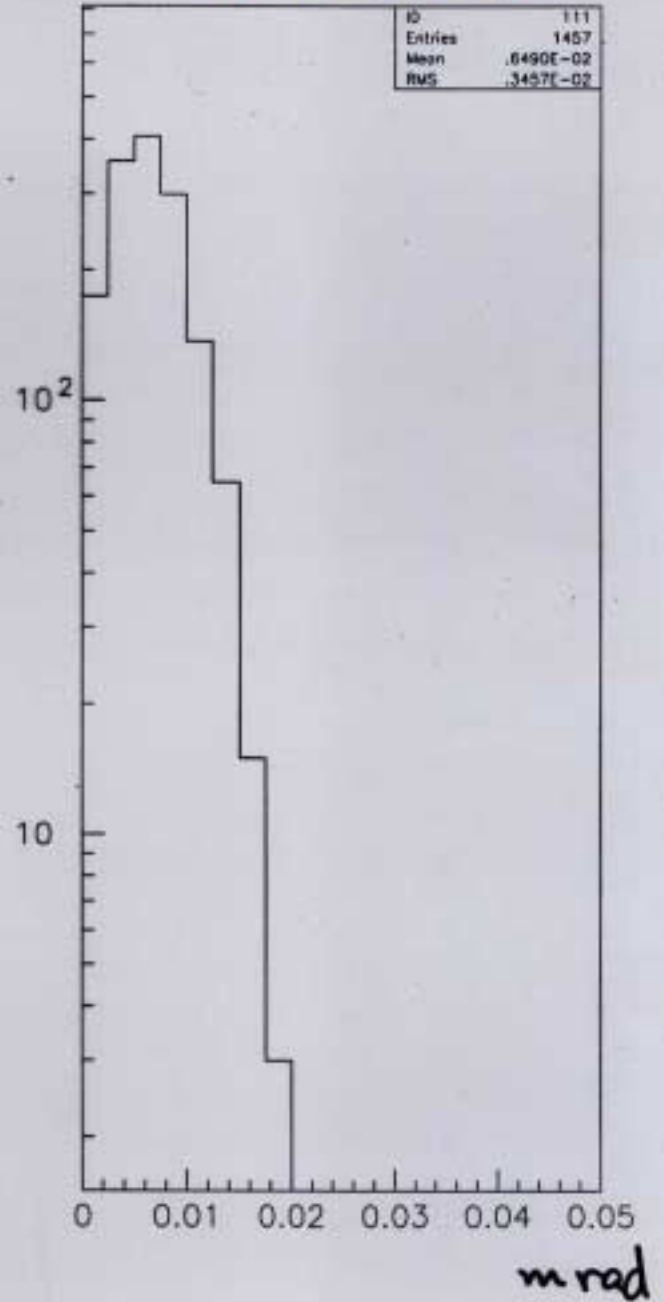
powder

Distortion

original



Refreshed



Summary

② Origine of Distortion

Drying after Pour

Not Developpe Process

③ Distortion Vector

'80 ~ 70 mrad E531. WA75
F653

'90 ~ 30 mrad CHORUS
DONAT

'00 5~6 mrad OPERA

↓

3-4 mrad