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CANADIAN PATENT APPLICATION

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(74) **Agent:** BRUNET & CO.

(54) **Titre : ENCRE MOLECULAIRE IMPRIMABLE**
(54) **Title: PRINTABLE MOLECULAR INK**

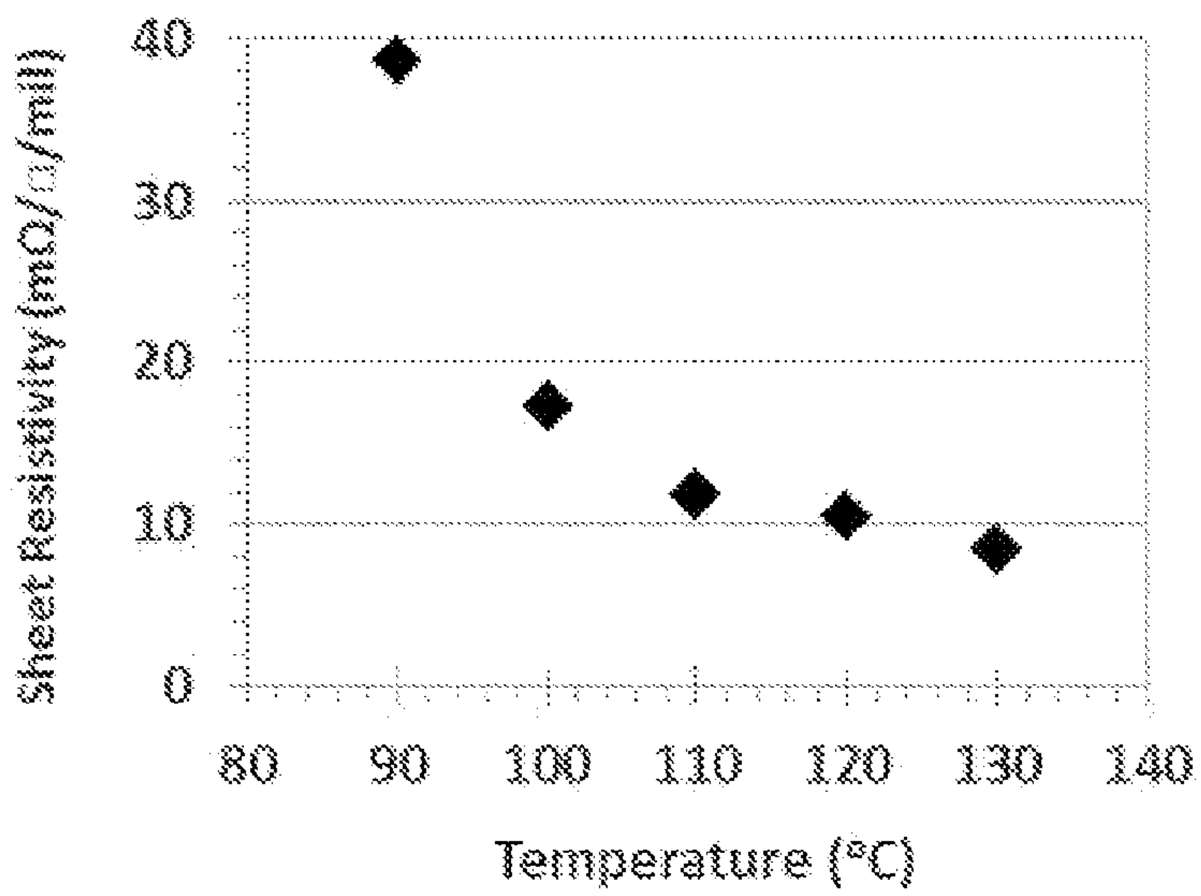


Fig. 2A

(57) **Abrégé/Abstract:**
A molecular ink contains a silver carboxylate, an organic amine compound, an organic polymer binder, a surface tension modifier, and a solvent. The ink may be used to produce conductive silver traces on a substrate for use in fabricating electronic devices. The ink is particularly useful for producing conductive silver traces on a shapeable (e.g. stretchable) substrate in a low temperature sintering process. Also, a process for producing a conductive silver trace on a shaped substrate involves depositing the molecular ink on a shapeable substrate, drying the ink on the shapeable substrate to form a non-conductive trace containing the silver carboxylate on the shapeable substrate, forming the shapeable substrate into a shape to produce a shaped substrate so that at least a portion of the non-conductive trace is situated on a shaped portion of the shaped substrate, and sintering the shaped substrate to decompose the silver carboxylate to metallic silver thereby producing a conductive silver trace on at least the shaped portion of the shaped substrate. The process reduces potential for cracking of conductive silver traces on shaped substrates.

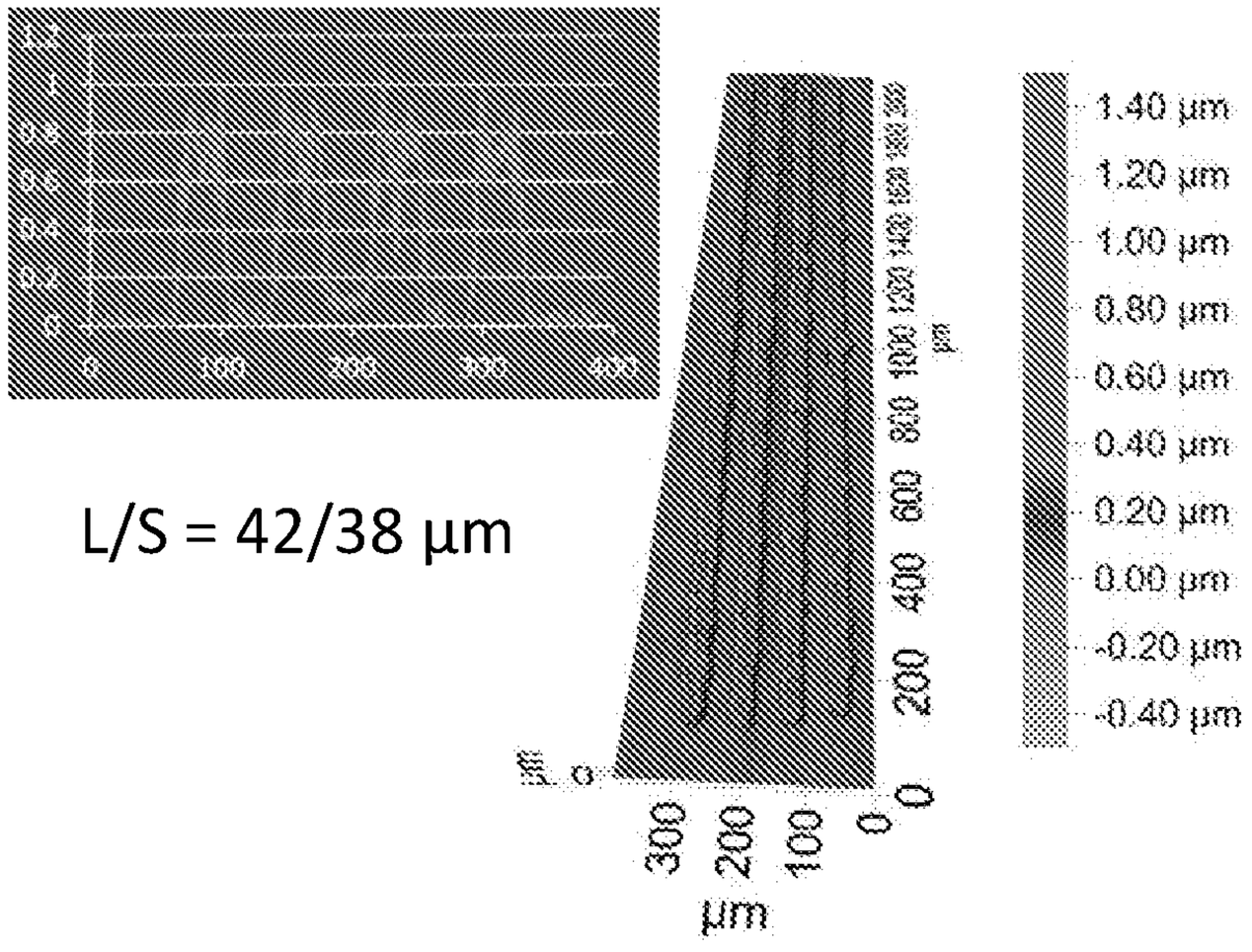

L/S = 42/38 µm
1.40 µm
1.20 µm
1.00 µm
0.80 µm
0.60 µm
0.40 µm
0.20 µm
0.00 µm
-0.20 µm
-0.40 µm
µm

Fig. 1A

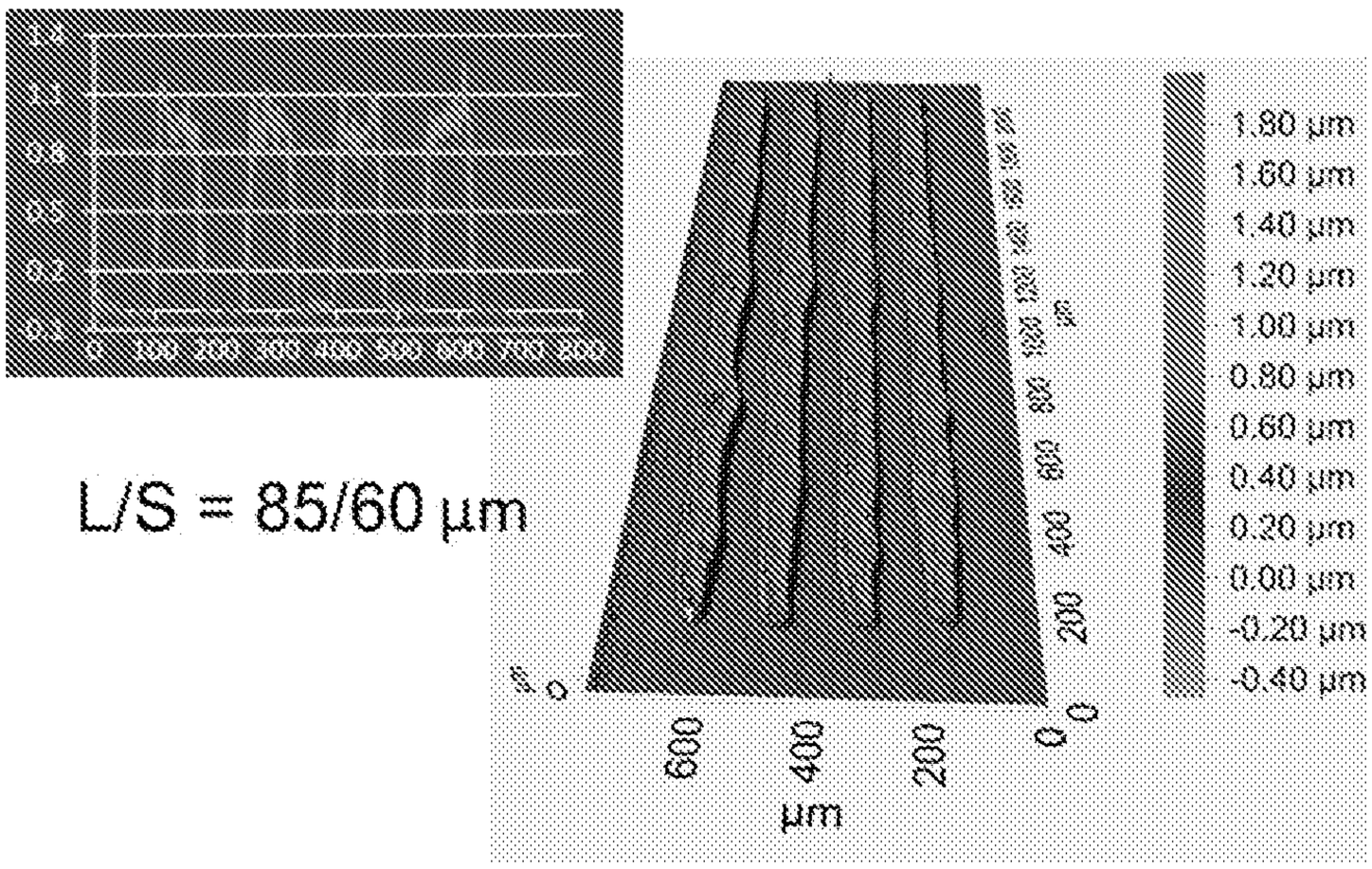

L/S = 85/60 µm
1.80 µm
1.60 µm
1.40 µm
1.20 µm
1.00 µm
0.80 µm
0.60 µm
0.40 µm
0.20 µm
0.00 µm
-0.20 µm
-0.40 µm
µm

Fig. 1B

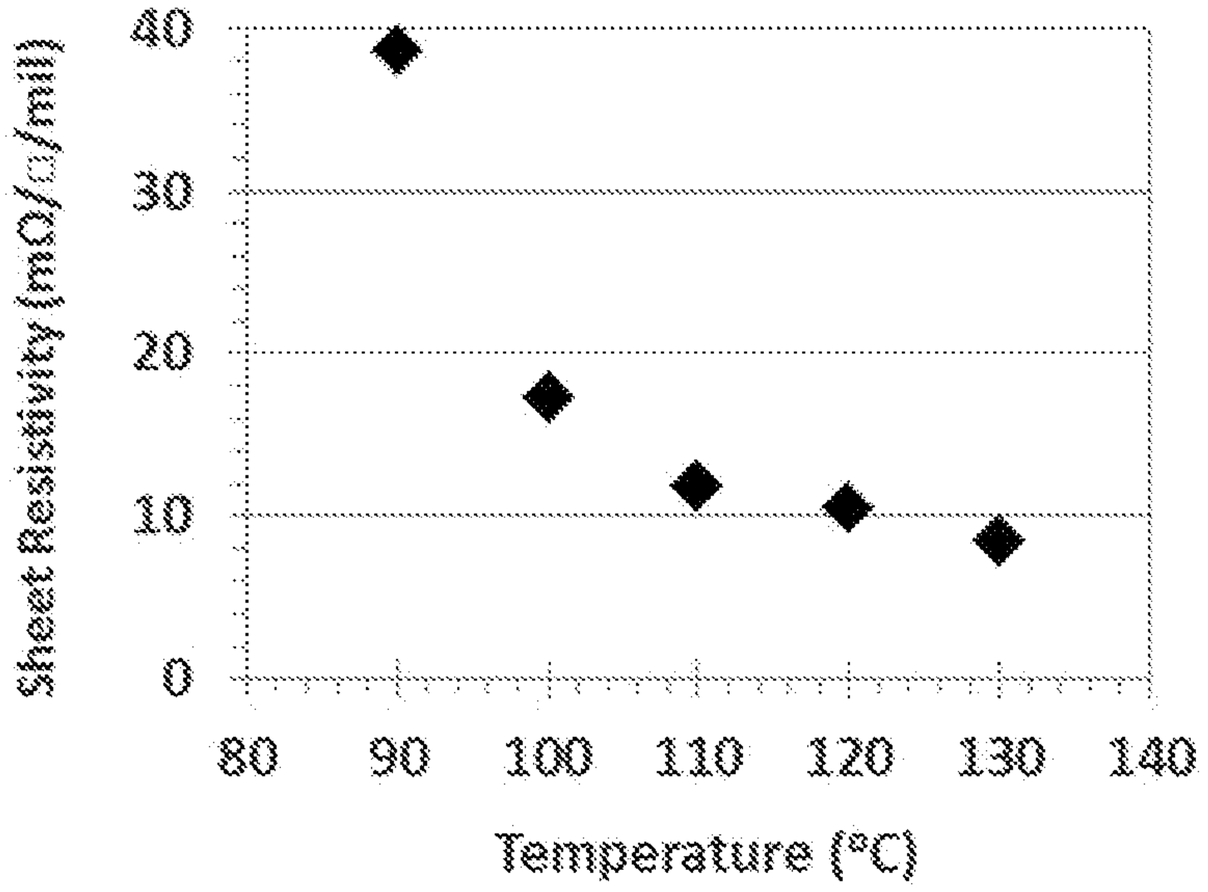

Sheet Resistivity (mΩ/□/mil)
40
30
20
10
0
80
90
100
110
120
130
140
Temperature (°C)

Fig. 2A

Sheet Resistivity (mΩ/□/mil)
20
15
10
5
0
80
90
100
110
120
130
140
Temperature (°C)

Fig. 2B

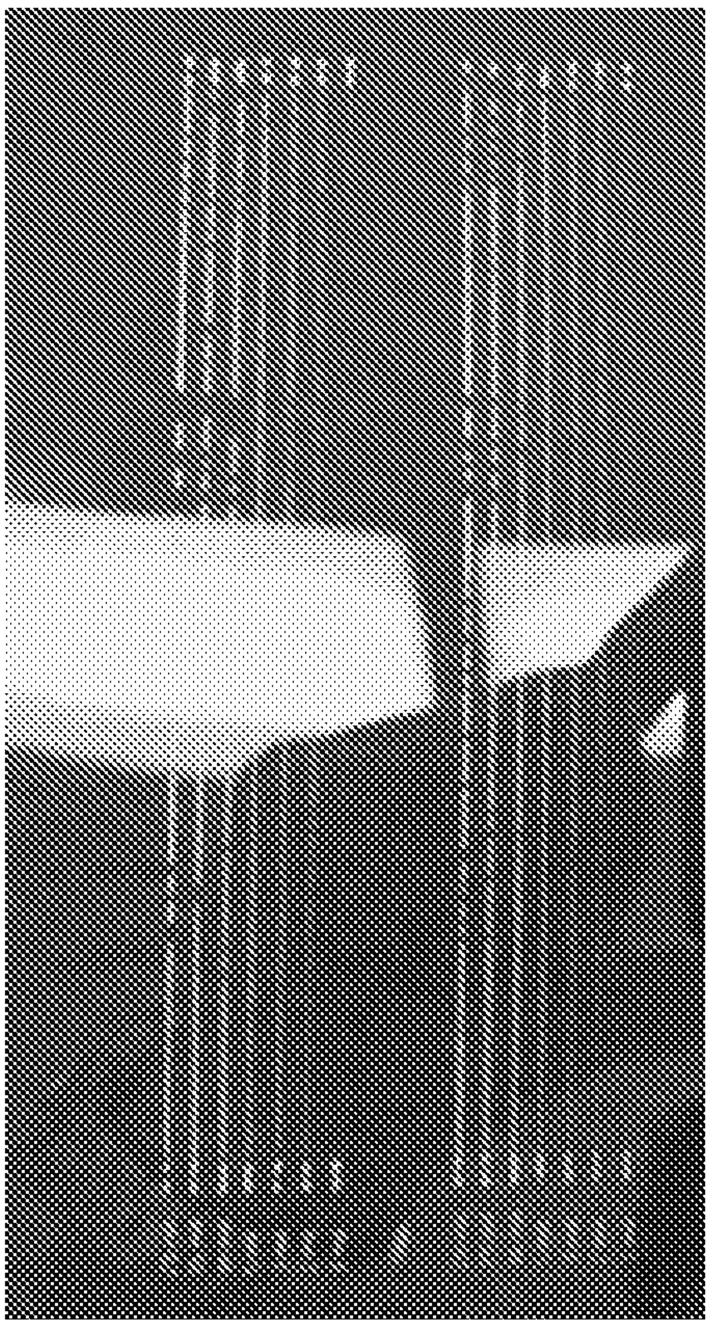


Fig. 3

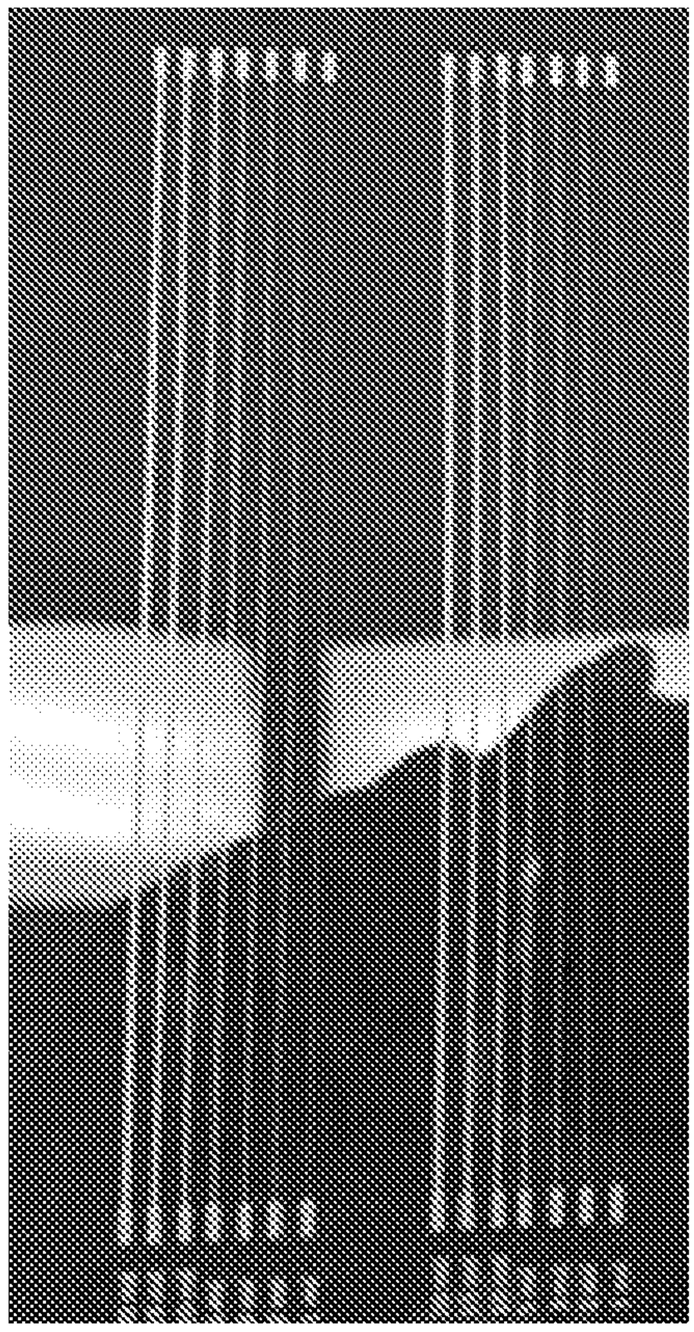


Fig. 4

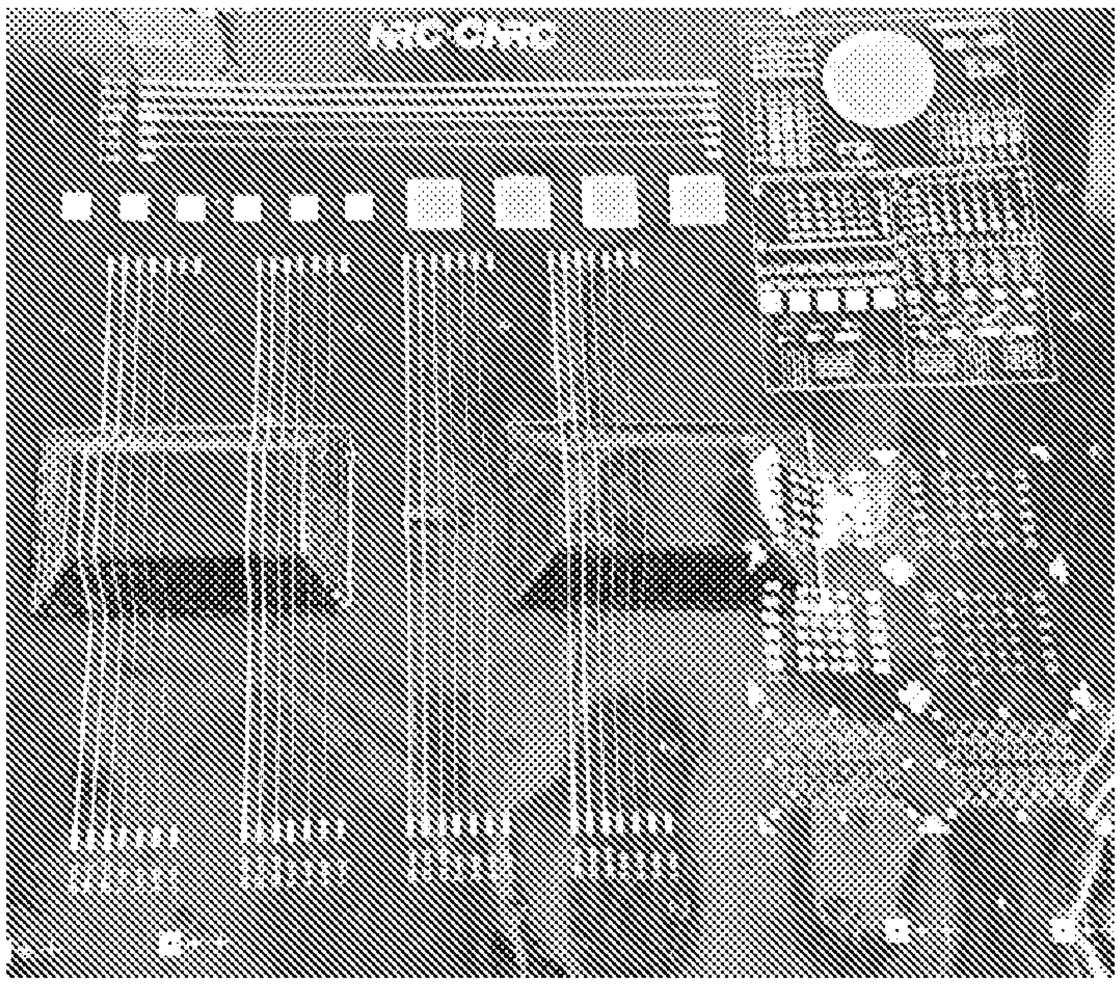


Fig. 5

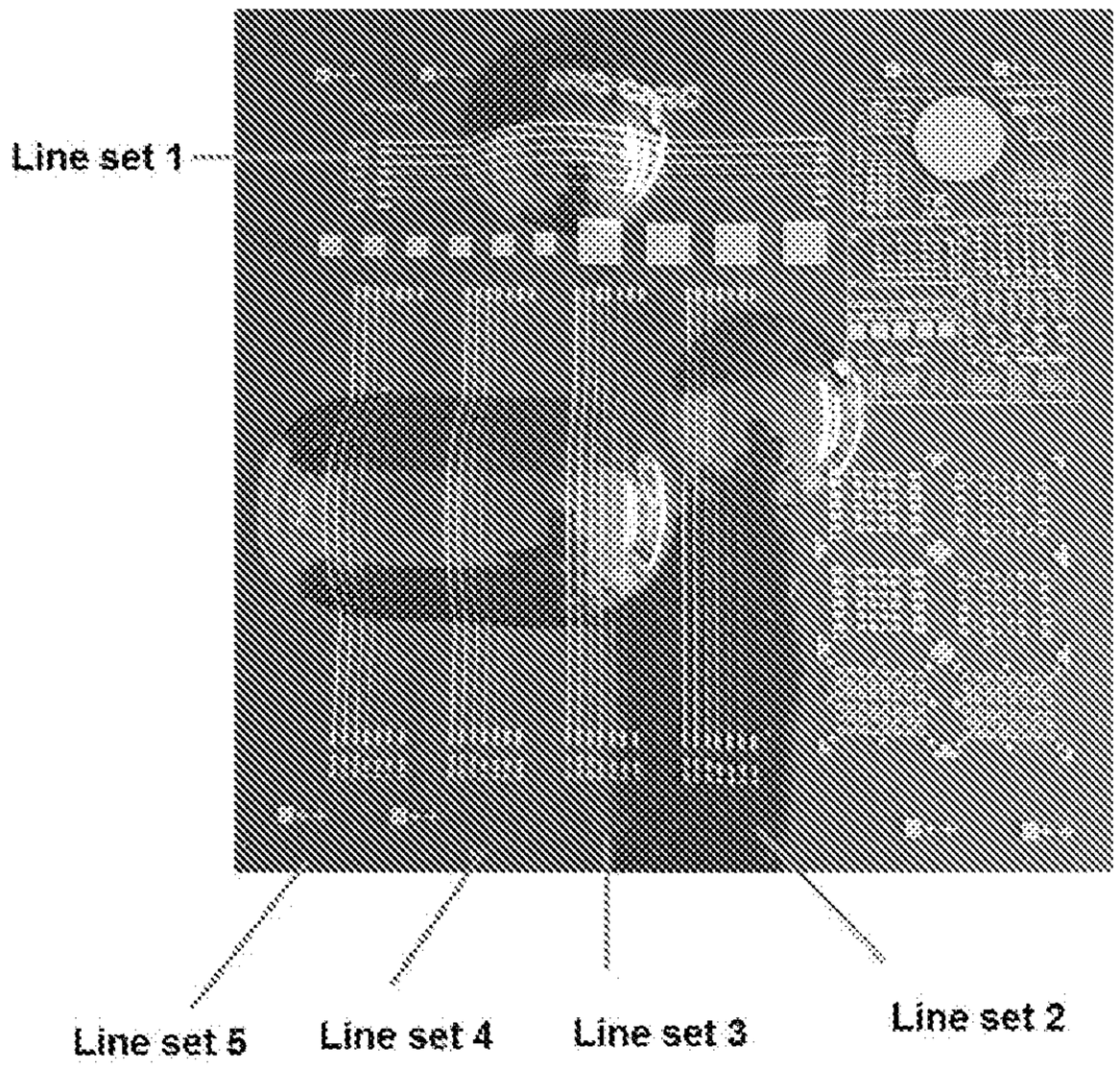


Fig. 6

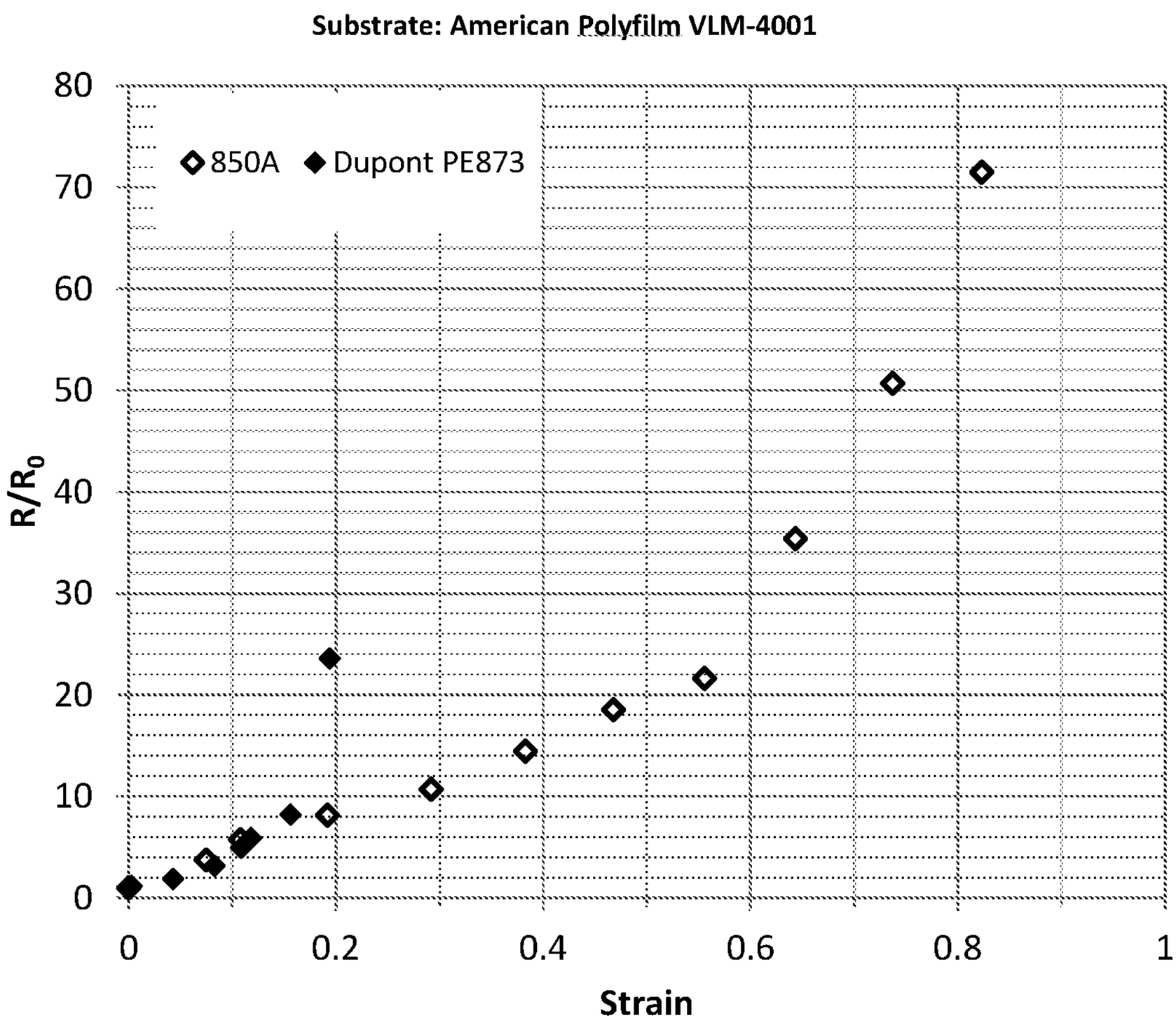

Substrate: American Polyfilm VLM-4001
850A
Dupont PE873
R/R0
Strain
0
10
20
30
40
50
60
70
80
0
0.2
0.4
0.6
0.8
1

Fig. 7A

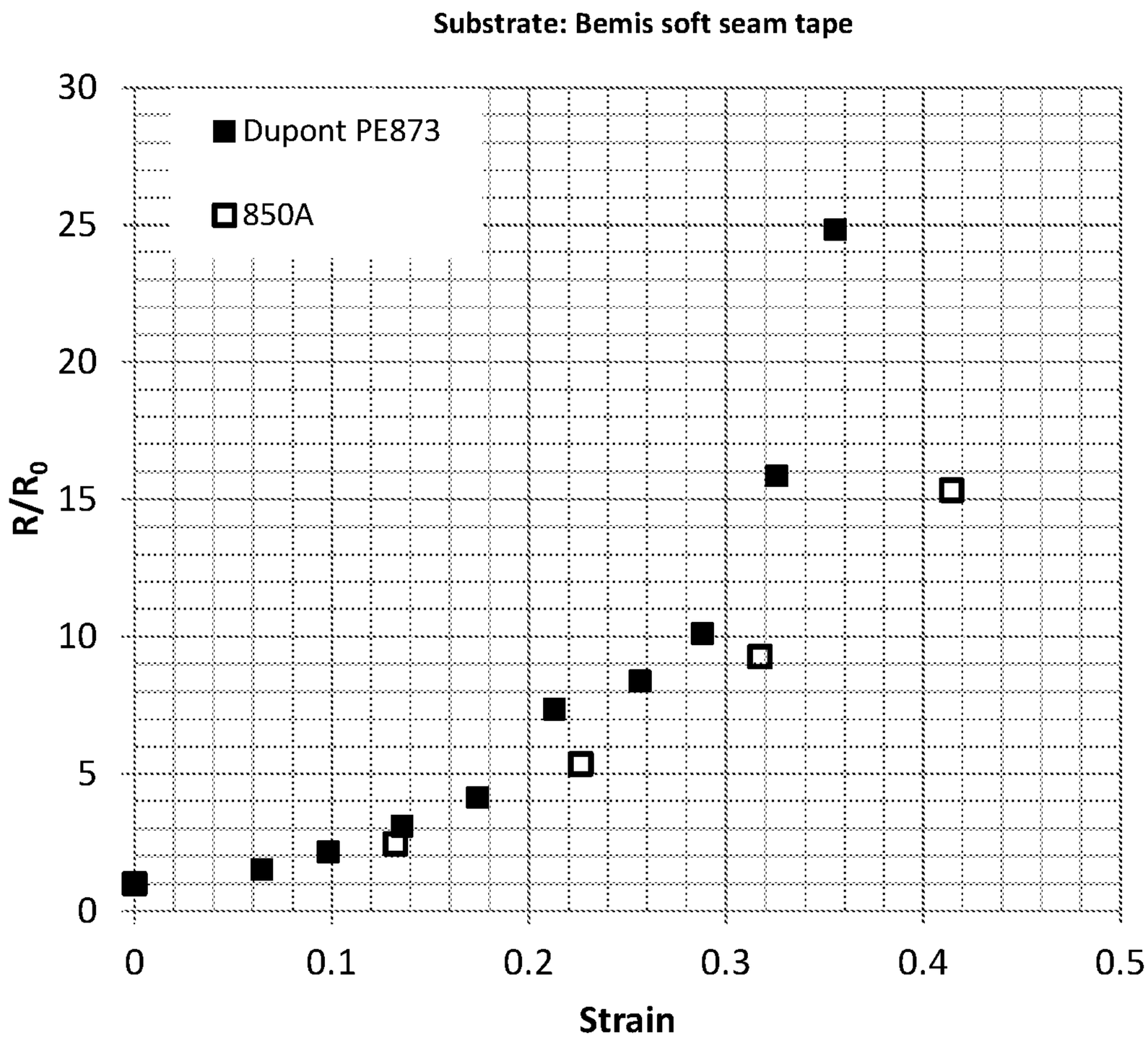

Substrate: Bemis soft seam tape
Dupont PE873
850A
R/R0
Strain
30
25
20
15
10
5
0
0
0.1
0.2
0.3
0.4
0.5

Fig. 7B


270°

Fig. 8A

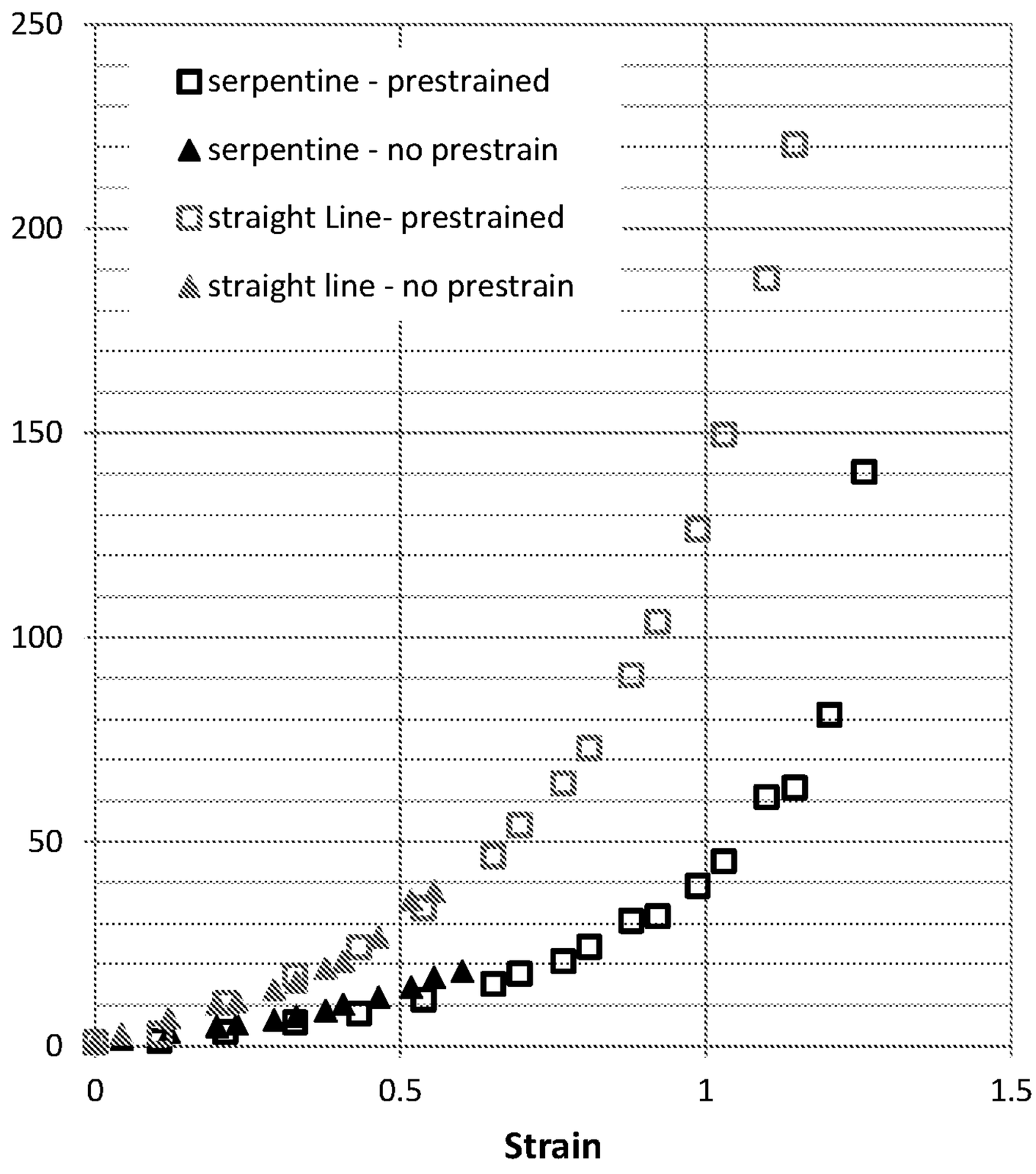

250
200
150
100
50
0
R/R0
0
0.5
1
1.5
Strain
serpentine - prestrained
serpentine - no prestrain
straight Line- prestrained
straight line - no prestrain

Fig. 8B

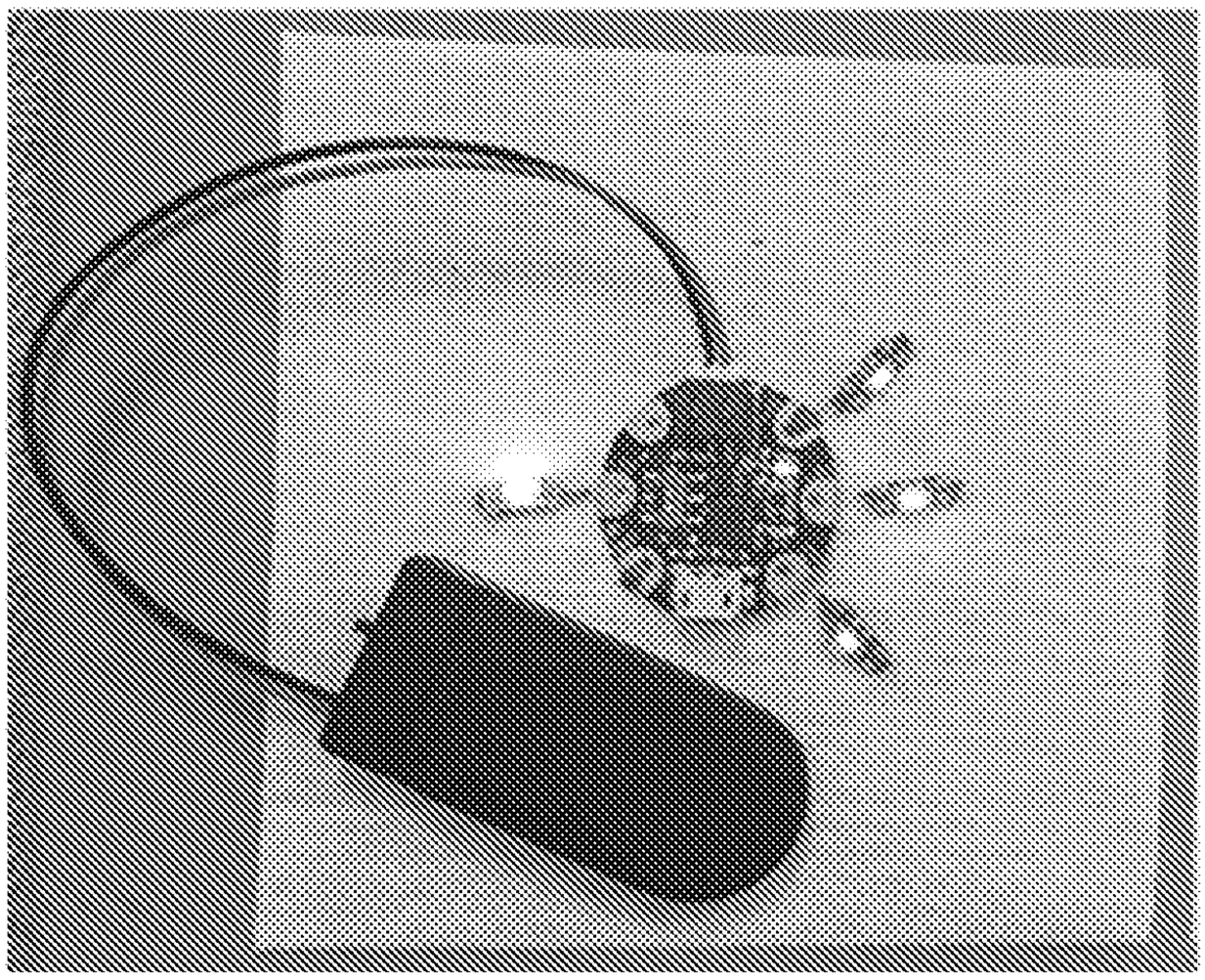


Fig 9A

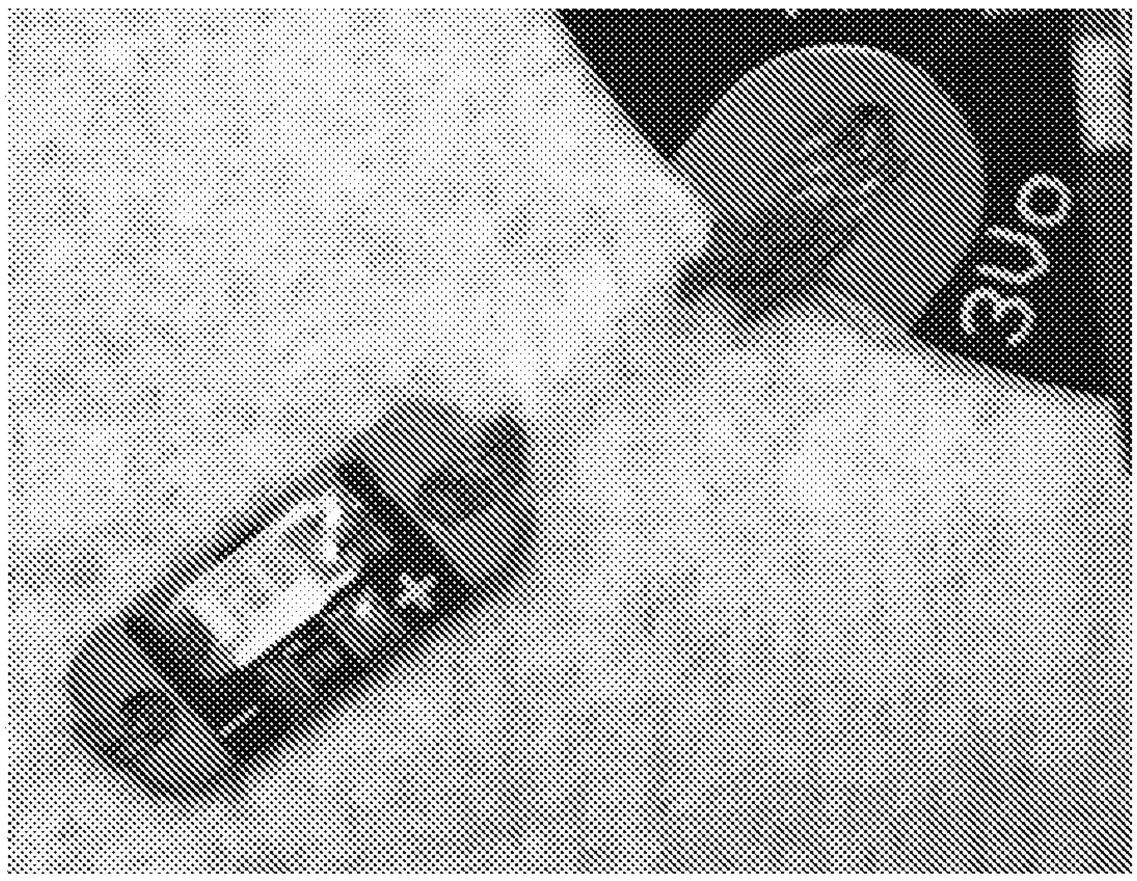
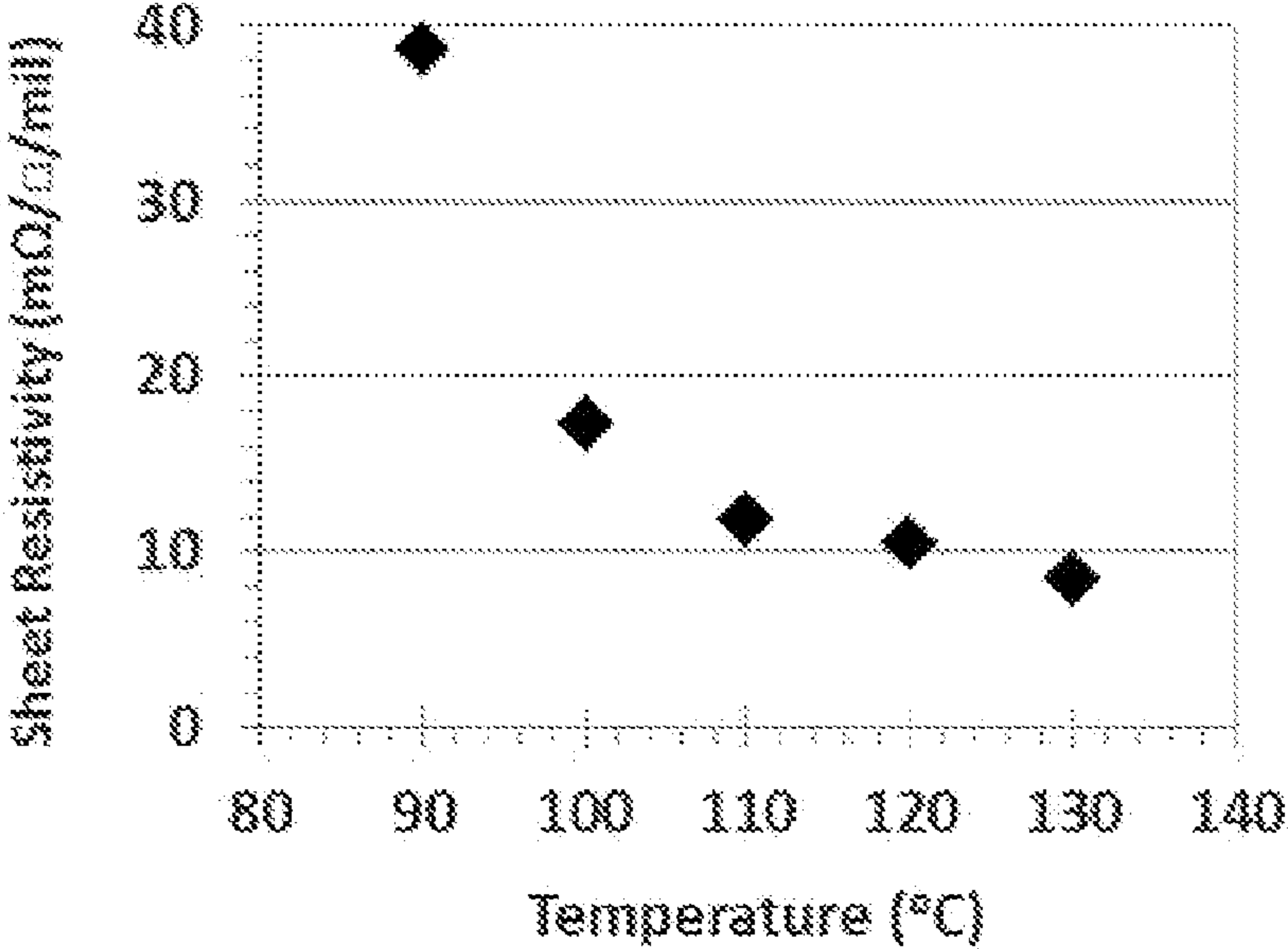


Fig. 9B



Sheet Resistivity (mΩ/□/mil)
40
30
20
10
0
80
90
100
110
120
130
140
Temperature (°C)

Fig. 2A