STRIPPING FOIL TEST

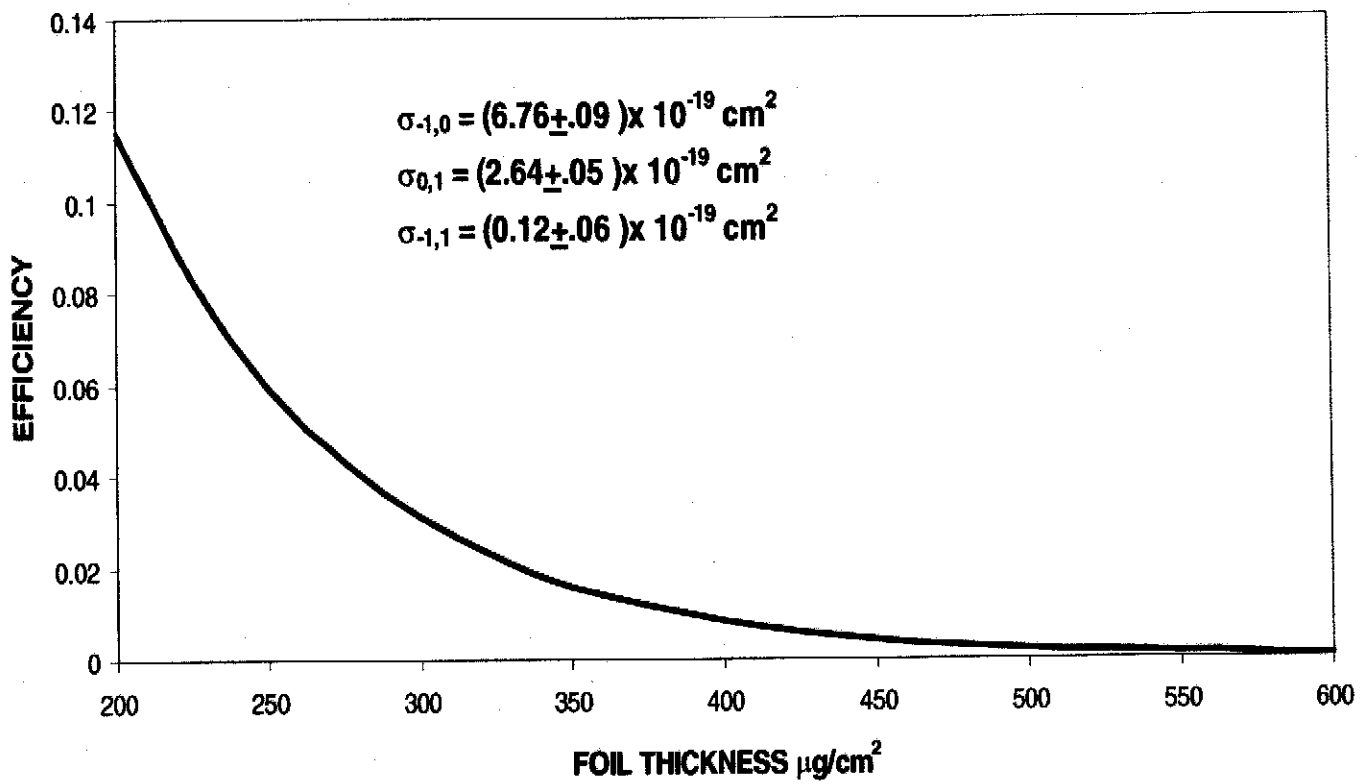
Y Y LEE

APRIL 11, 2002

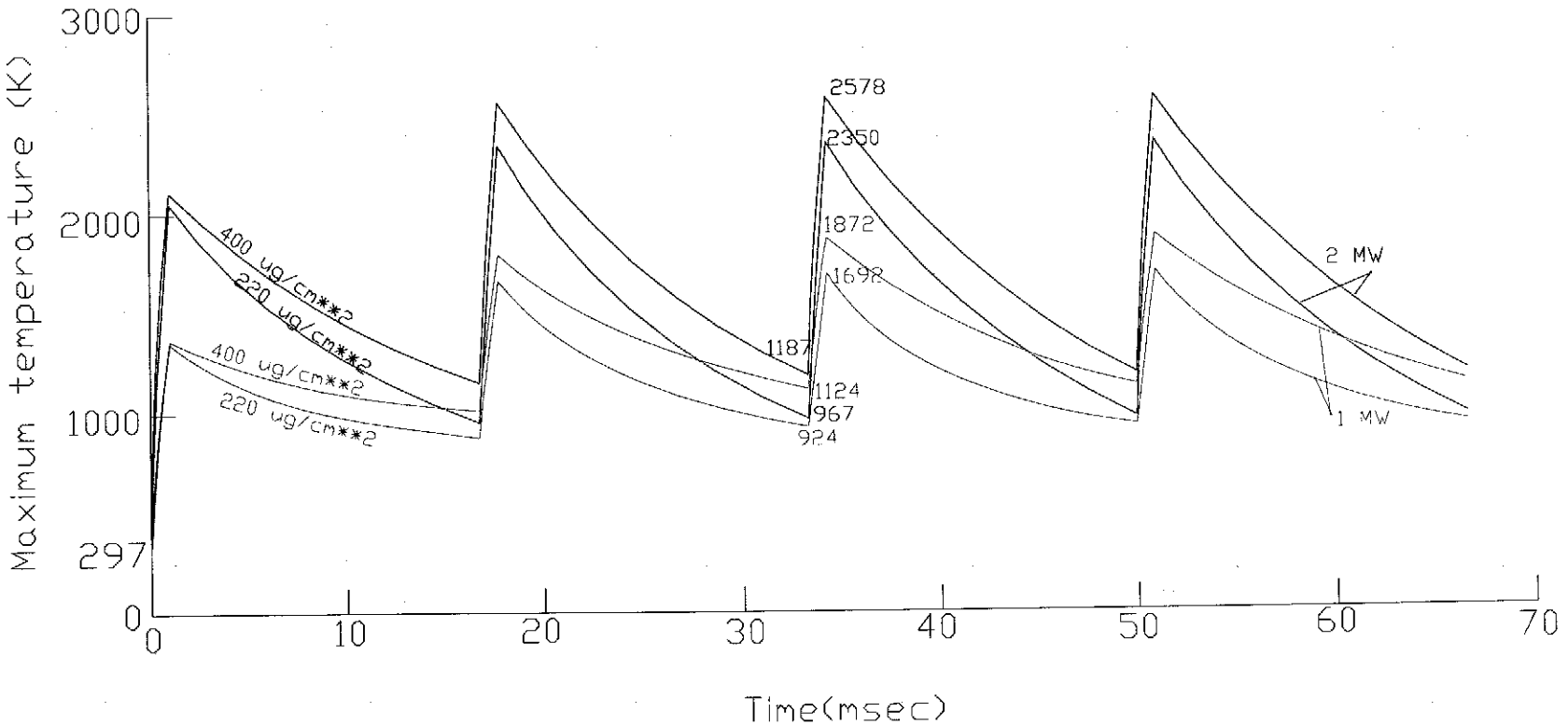
H^- STRIPPING FOIL ISSUES

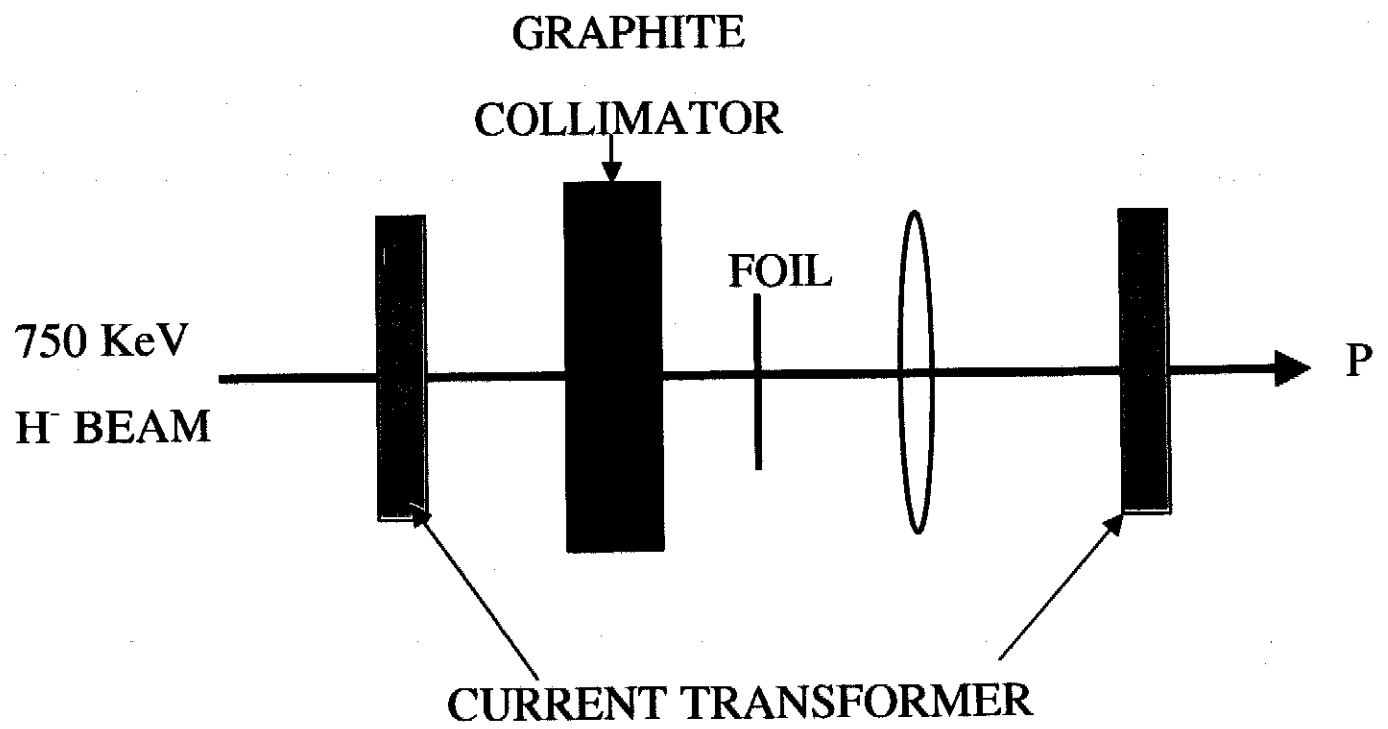
- REQUIREDHIGH INTENSITY LINAC BEAM
- HEAT LOSS MECHANISM
  - BLACKBODY RADIATION
  - CONDUCTION
- THERMAL SHOCK OF RAPID HEATING AND COOLING
- HEATING---VOLUME EFFECT
- COOLING---SURFACE
  - THE THINER SURVIVES LONGER

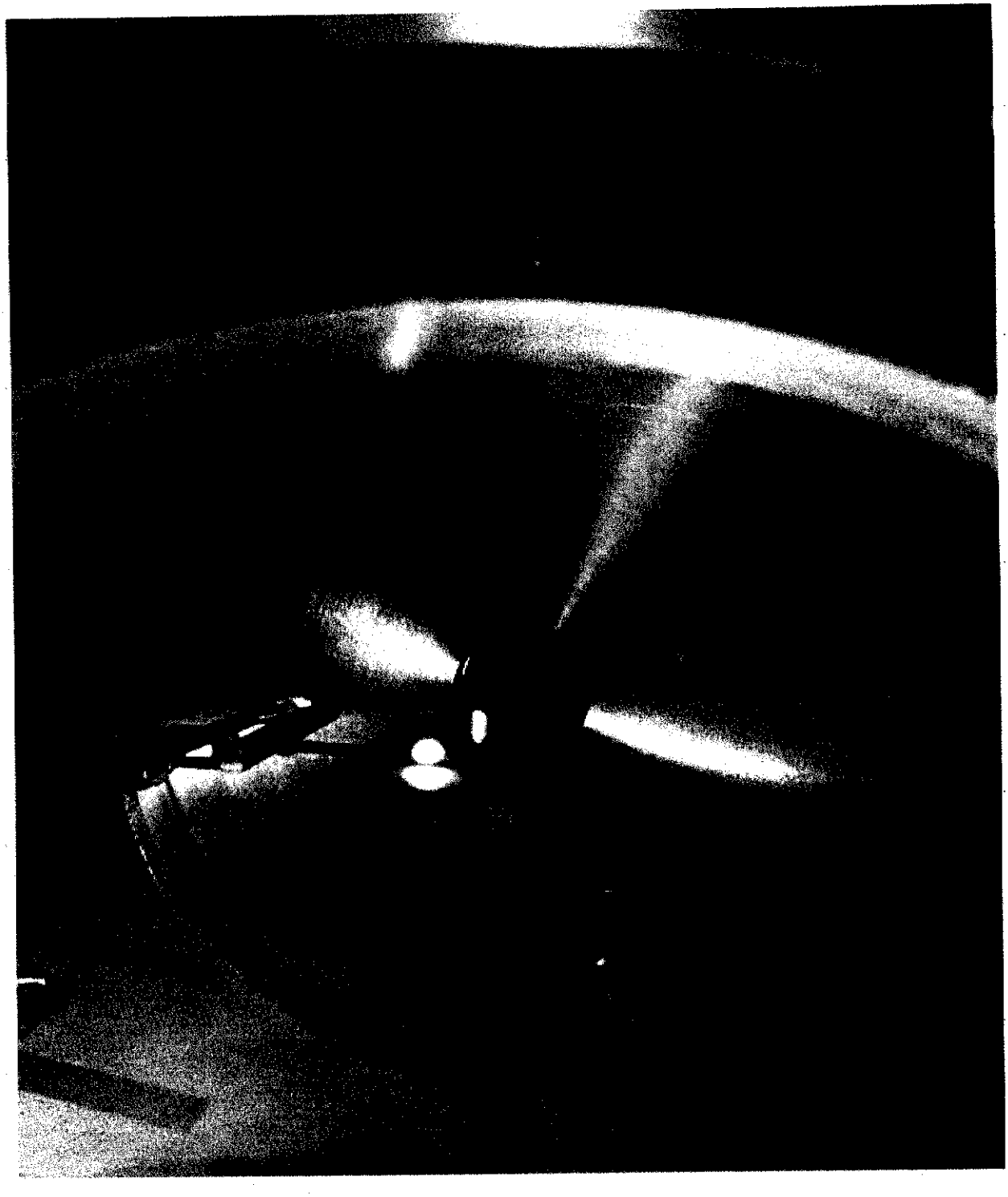
STRIPPING EFFICIENCY @ 1 GeV

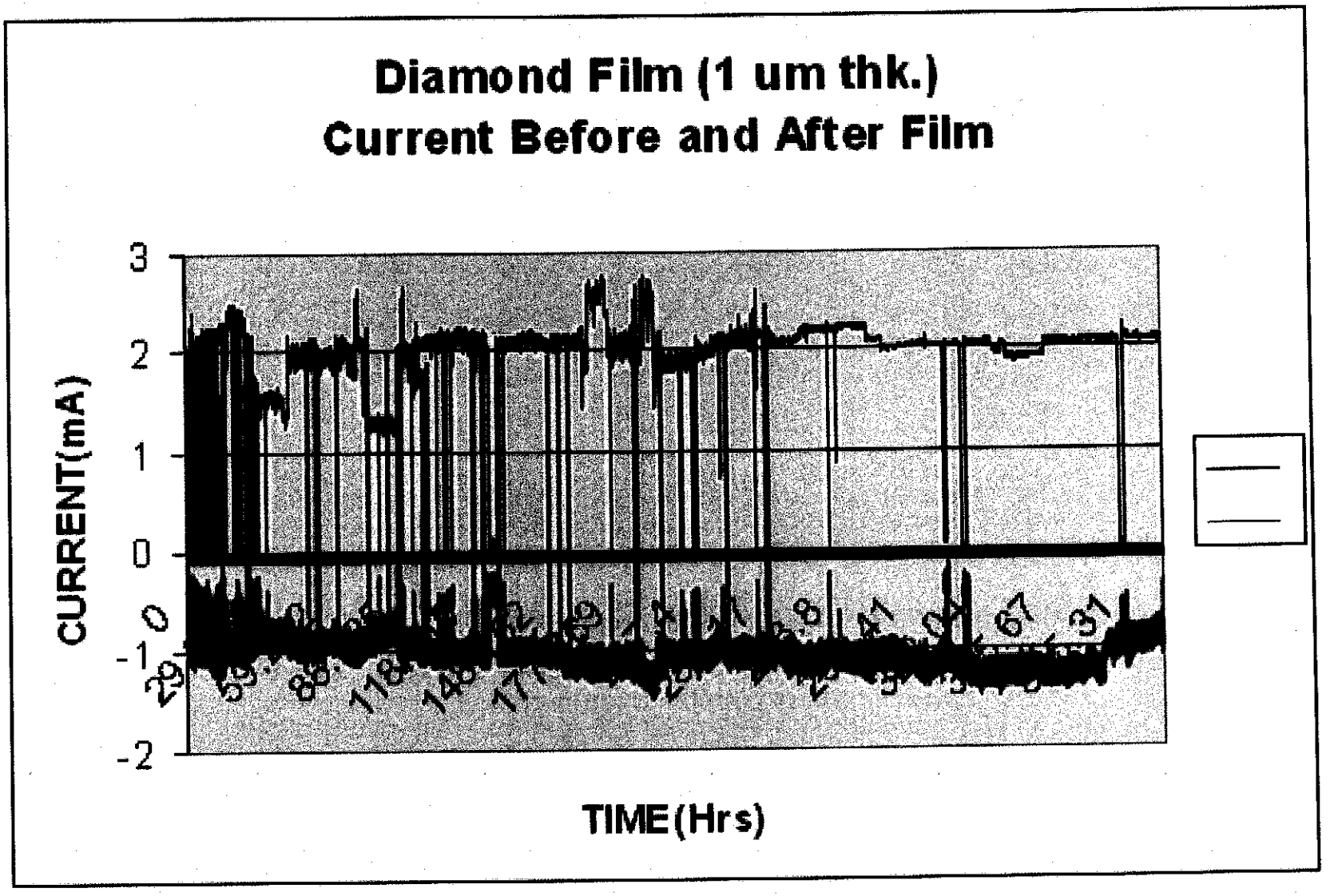


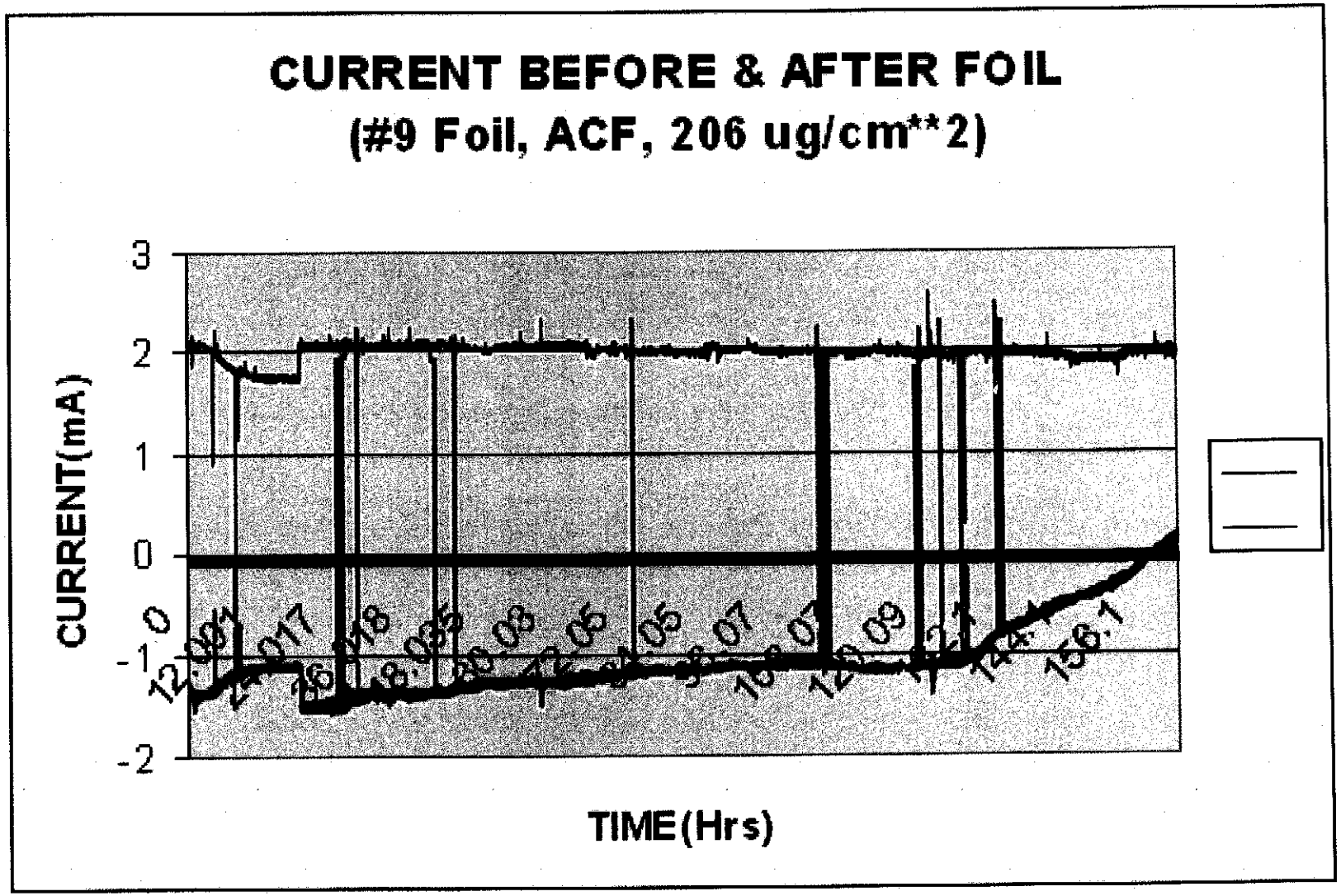
Maximum Temperatures on The SNS Carbon Stripping Foils

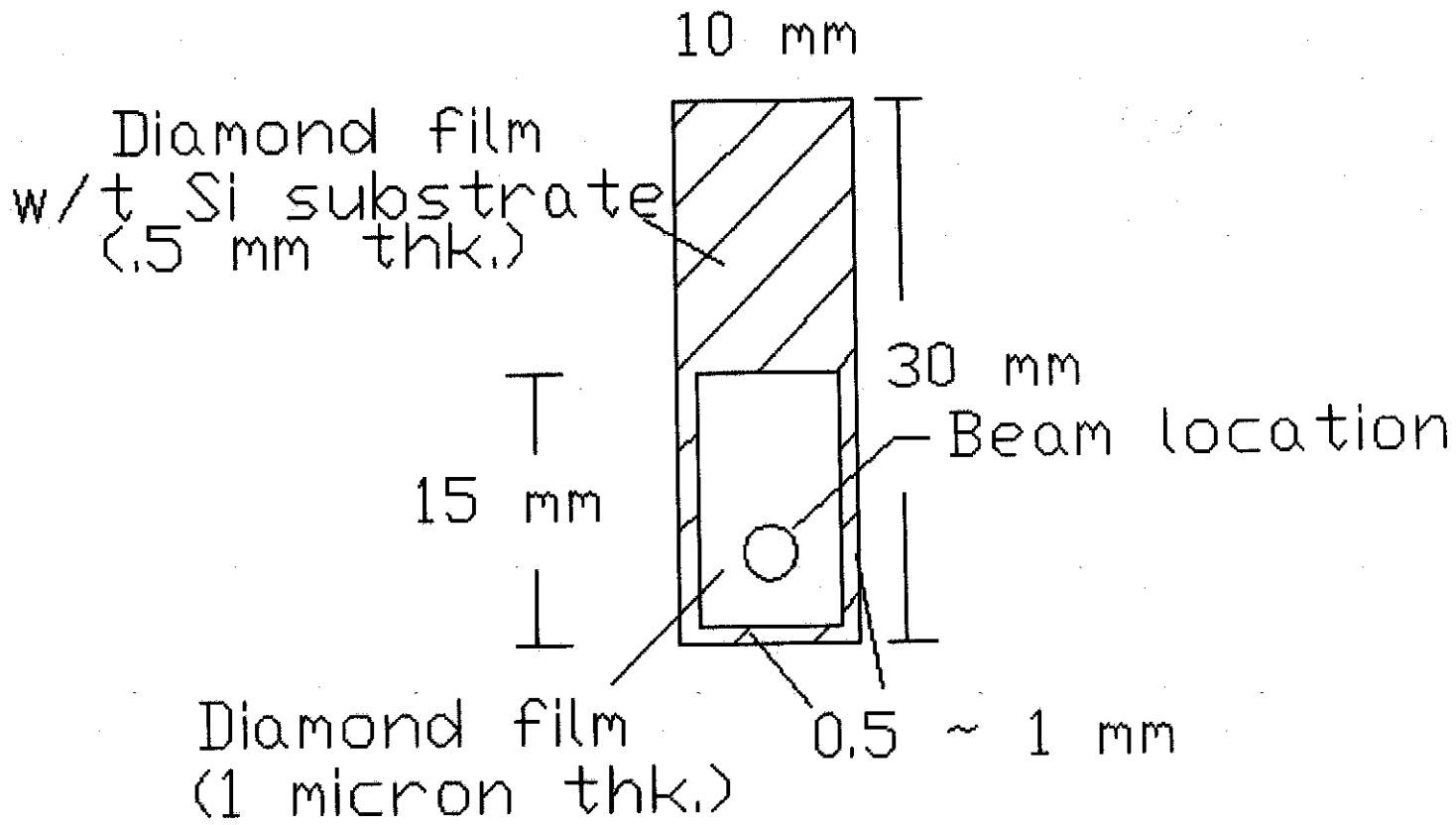


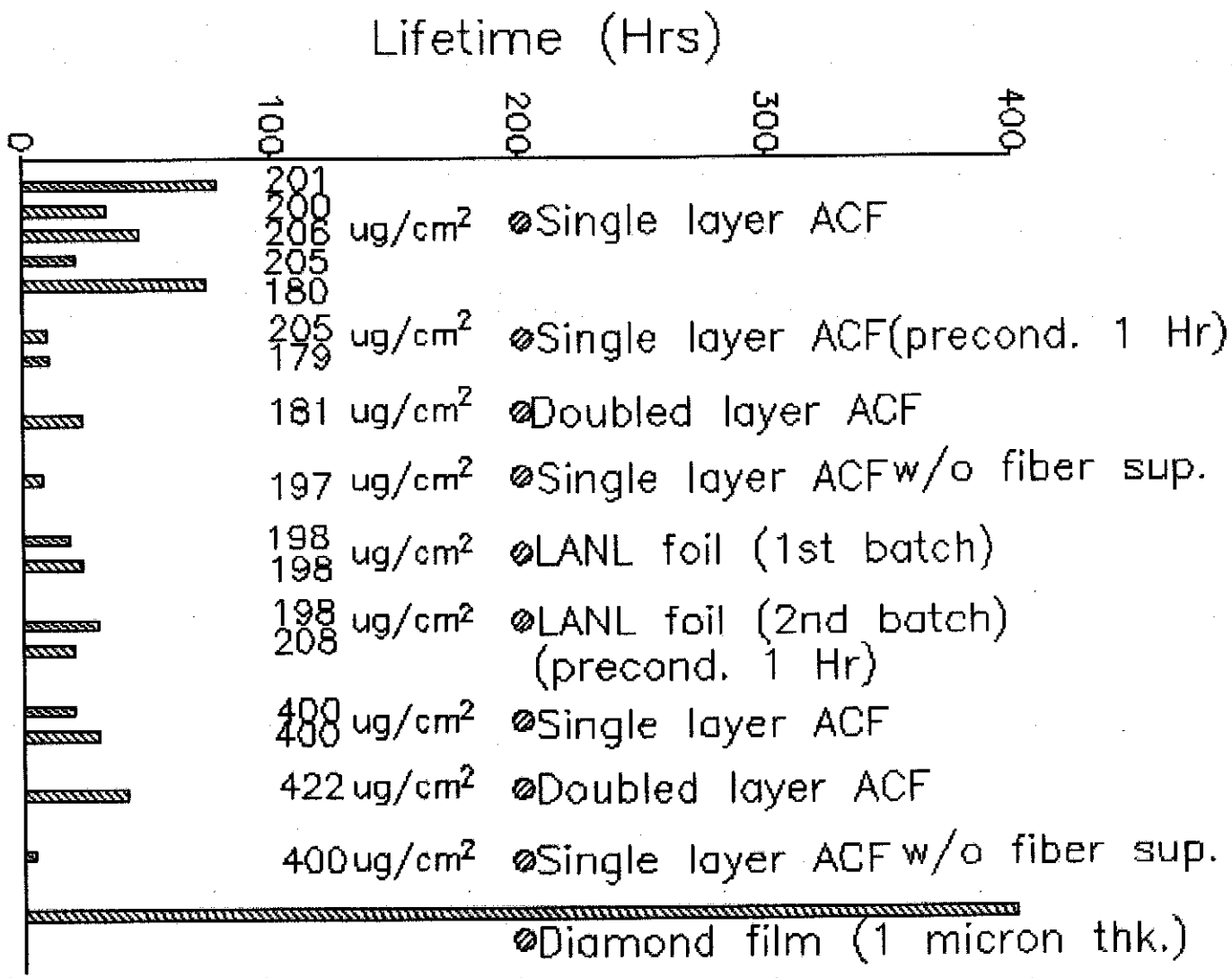

GRAPHITE
COLLIMATOR
FOIL
750 KeV
H⁻ BEAM
P
CURRENT TRANSFORMER



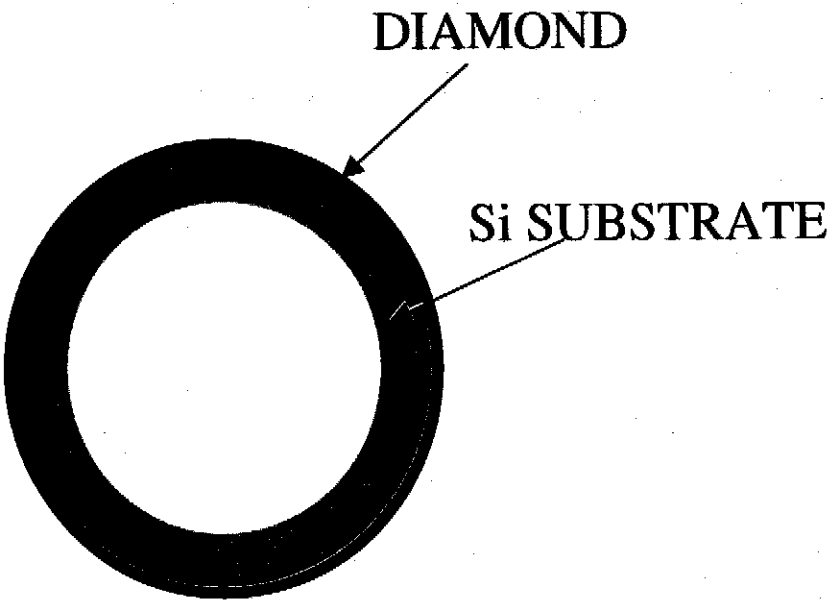

Diamond Film (1 um thk.)
Current Before and After Film
CURRENT(mA)
3
2
1
0
-1
-2
TIME(Hrs)


CURRENT BEFORE & AFTER FOIL
(#9 Foil, ACF, 206 ug/cm**2)
CURRENT(mA)
3
2
1
0
-1
-2
TIME(Hrs)


10 mm
Diamond film
w/t Si substrate
(.5 mm thk.)
30 mm
Beam location
15 mm
Diamond film
(1 micron thk.)
0.5 ~ 1 mm


Lifetime (Hrs)
0
100
200
300
400
201
200
206 ug/cm2
205
180
Single layer ACF
205
179 ug/cm2
Single layer ACF(precond. 1 Hr)
181 ug/cm2
Doubled layer ACF
197 ug/cm2
Single layer ACF w/o fiber sup.
198
198 ug/cm2
LANL foil (1st batch)
198
208 ug/cm2
LANL foil (2nd batch)
(precond. 1 Hr)
400
400 ug/cm2
Single layer ACF
422 ug/cm2
Doubled layer ACF
400 ug/cm2
Single layer ACF w/o fiber sup.
Diamond film (1 micron thk.)

CVD DIAMOND FOIL

- 350 $\mu g/Cm^2$
- BUILT IN STRESS
- IF ONE COULD BUILD STRESS FREE CVD DIAMOND
- GROUP IN ORNL AND UT IS WORKING ON IT

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