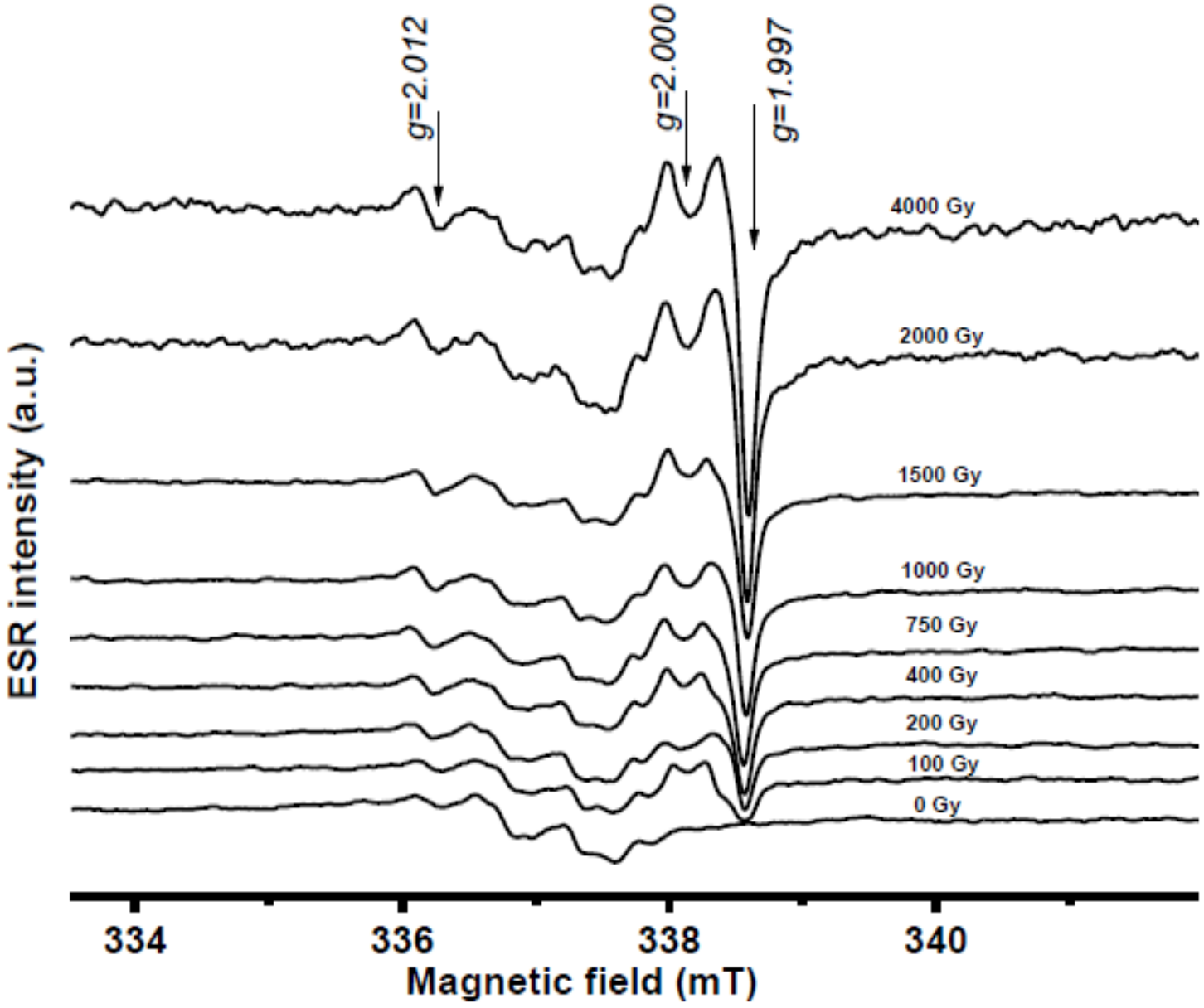
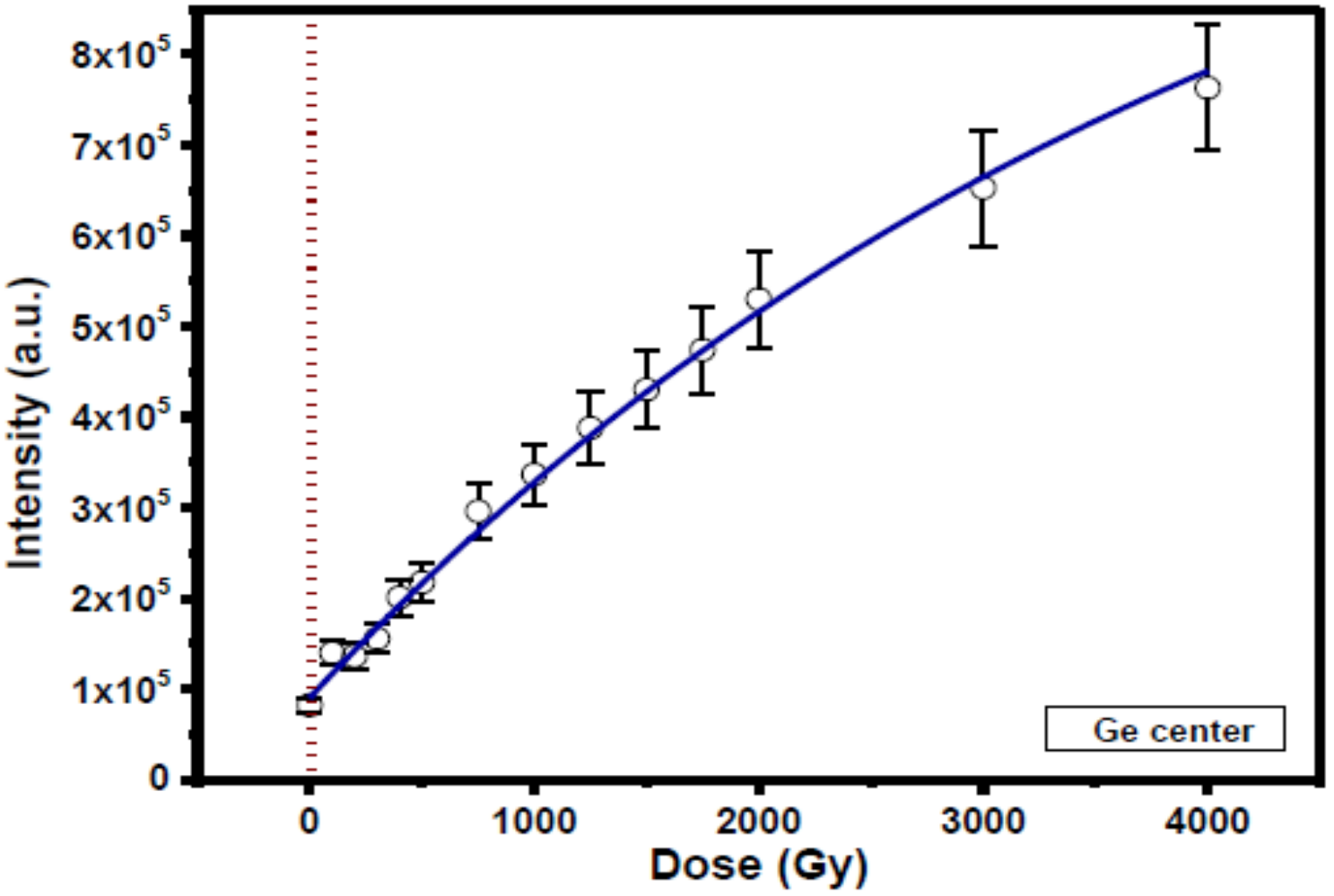
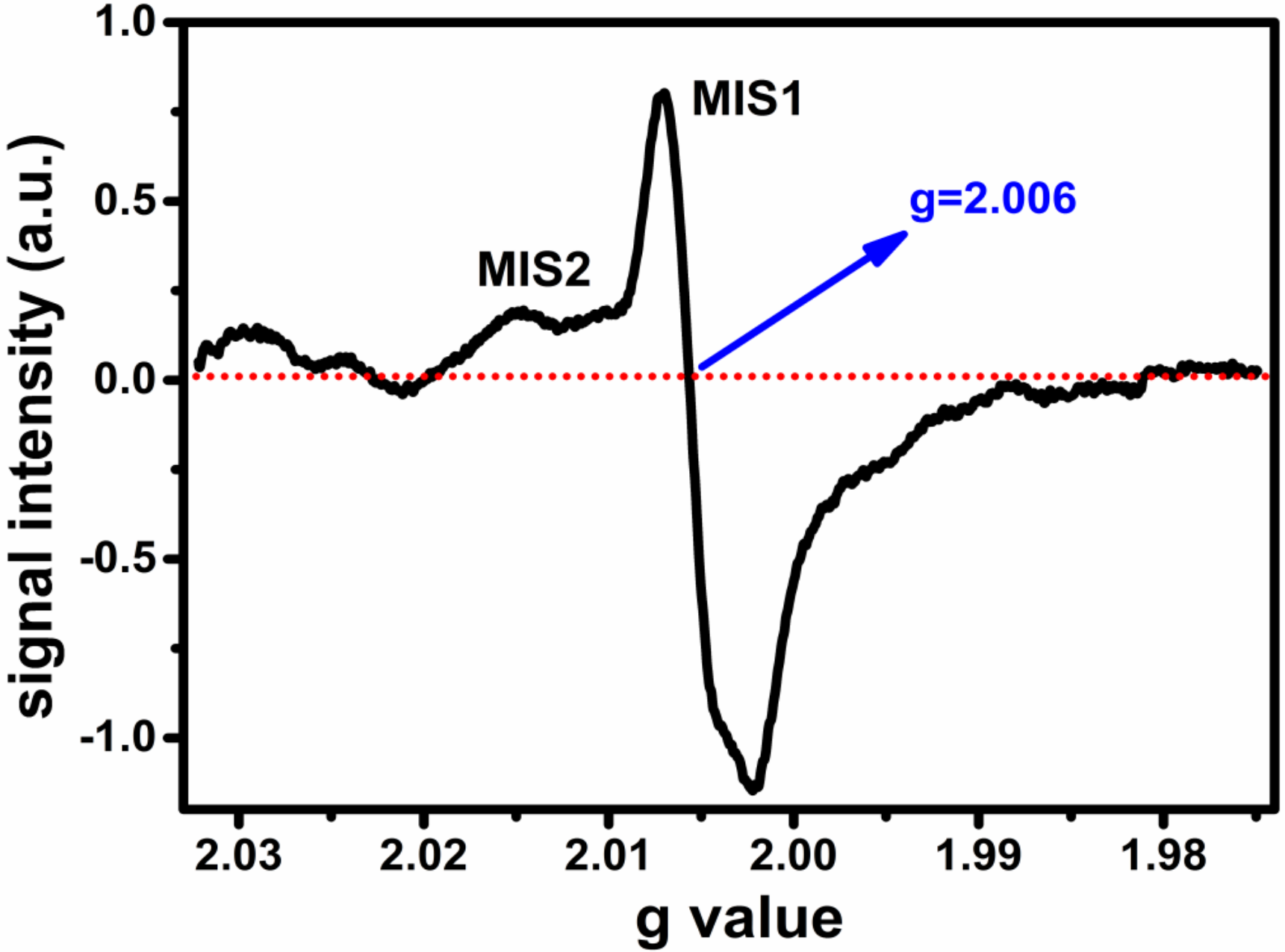
Quartz

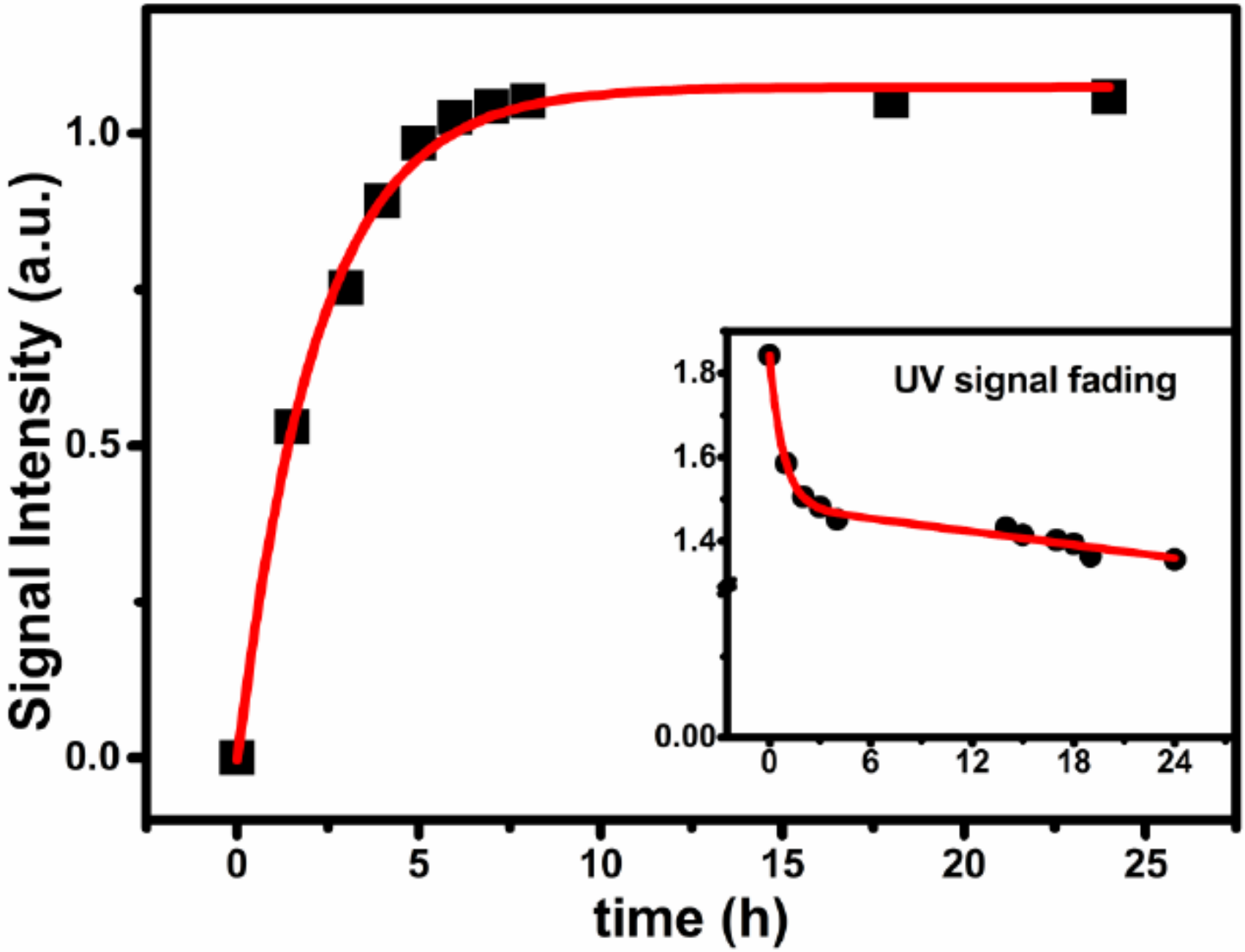

g=2.012
g=2.000
g=1.997
4000 Gy
2000 Gy
1500 Gy
1000 Gy
750 Gy
400 Gy
200 Gy
100 Gy
0 Gy
ESR intensity (a.u.)
334
336
338
340
Magnetic field (mT)

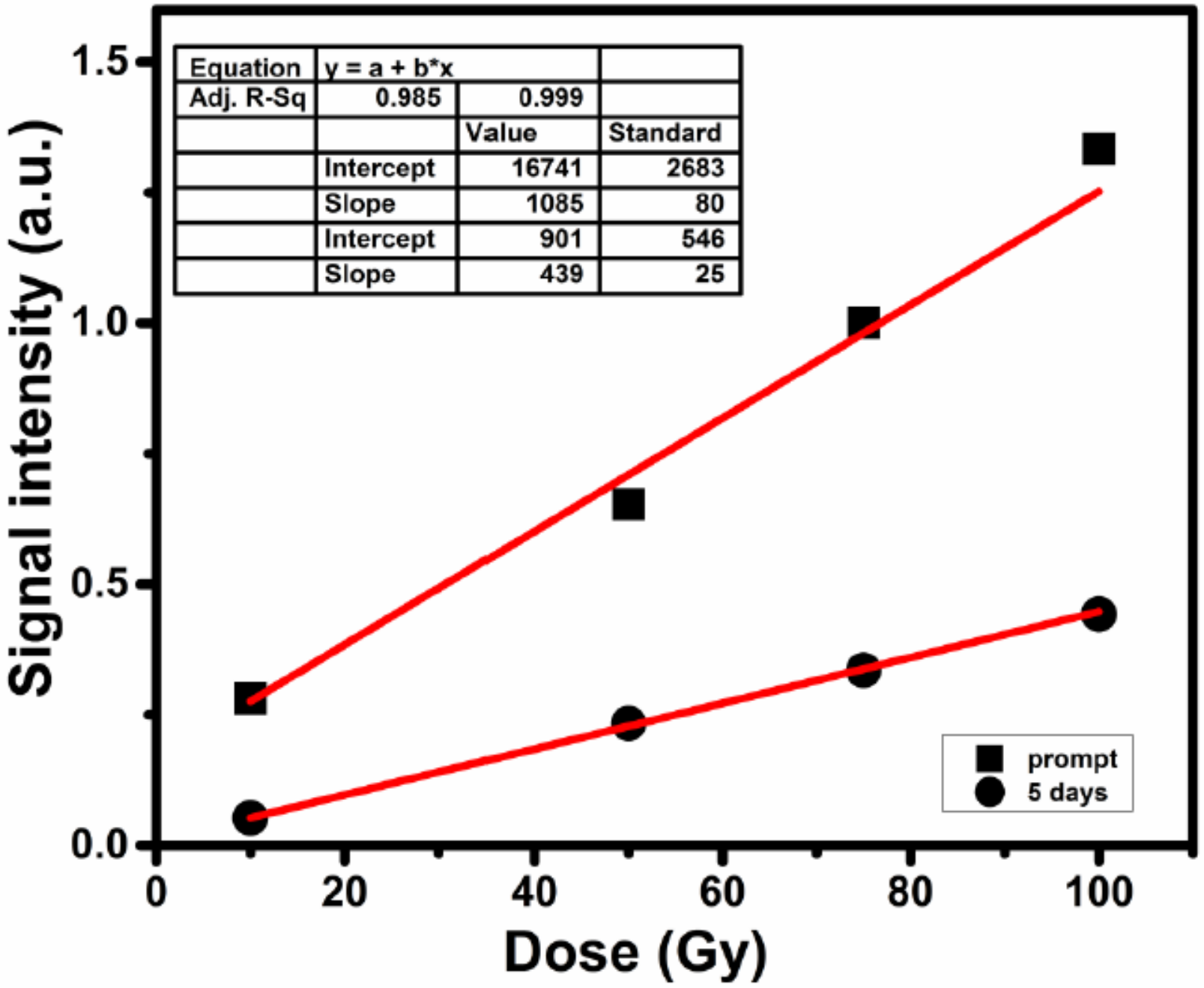


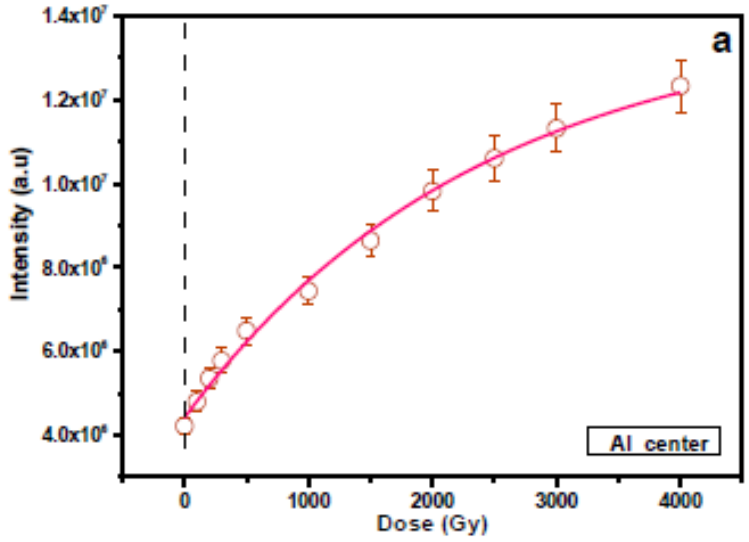
$$I = I_{max}(1 - exp(-(D + D_E)/ D_0)),$$

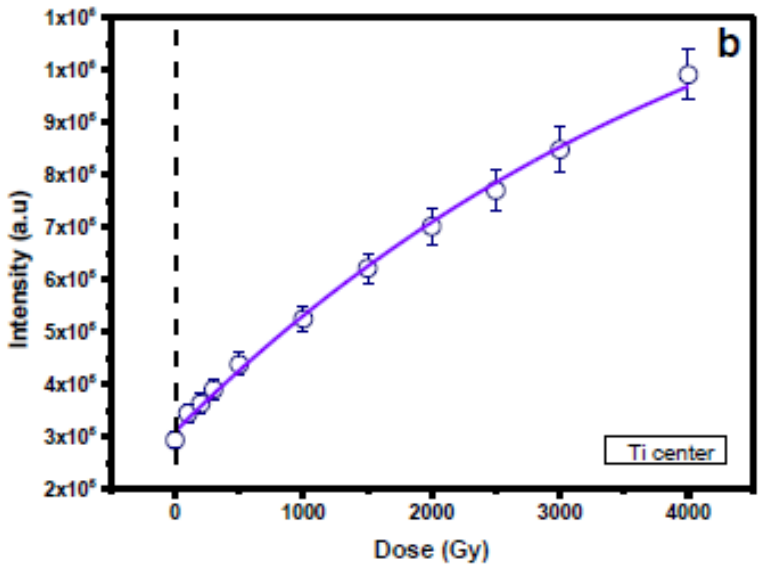
Nails


1.0
0.5
0.0
-0.5
-1.0
signal intensity (a.u.)
MIS1
MIS2
g=2.006
2.03
2.02
2.01
2.00
1.99
1.98
g value


Signal Intensity (a.u.)
1.0
0.5
0.0
0
5
10
15
20
25
time (h)
UV signal fading
1.8
1.6
1.4
0.00
0
6
12
18
24

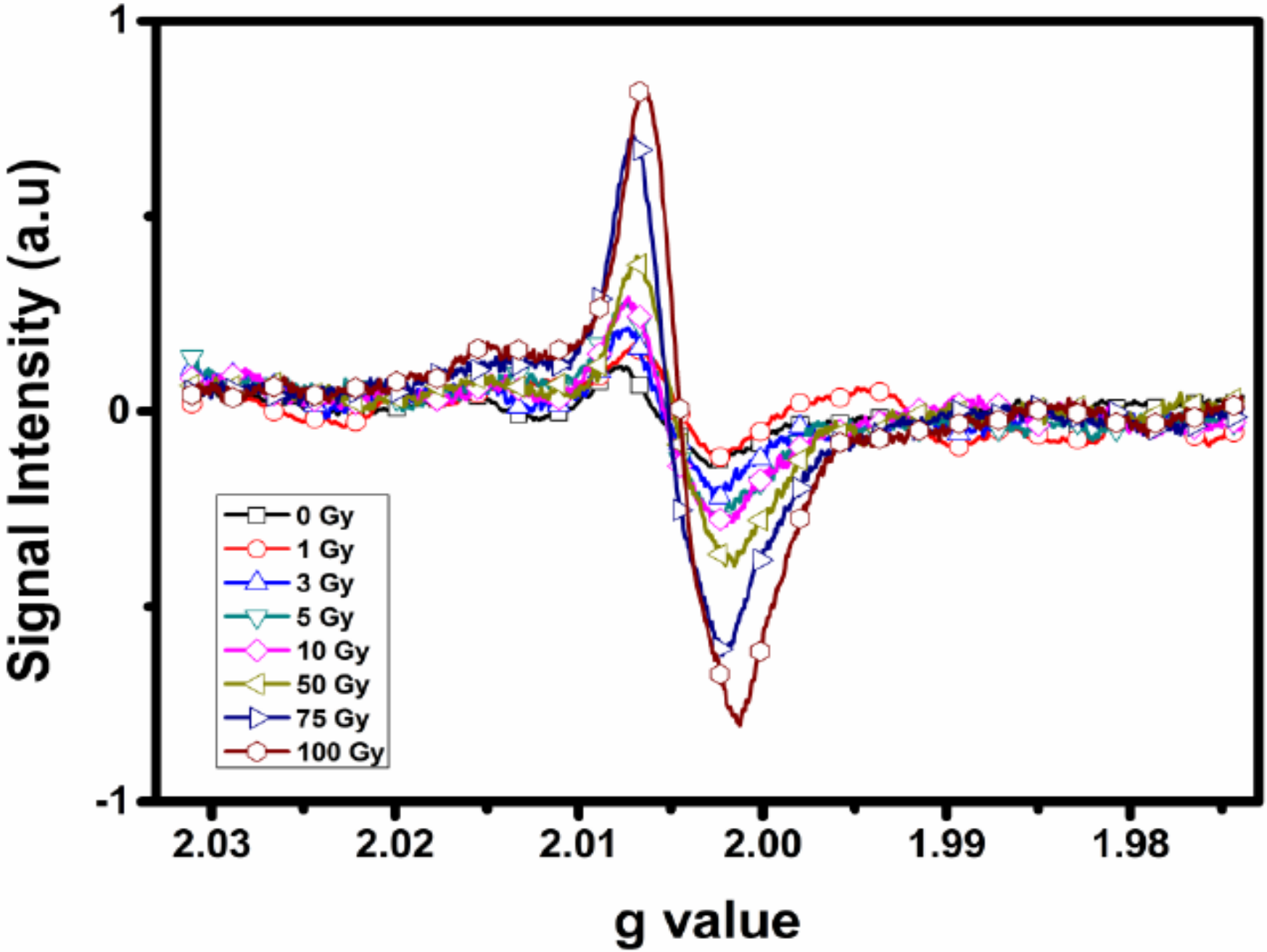

Equation y = a + b*x
Adj. R-Sq 0.985 0.999
Value Standard
Intercept 16741 2683
Slope 1085 80
Intercept 901 546
Slope 439 25
Signal intensity (a.u.)
1.5
1.0
0.5
0.0
0
20
40
60
80
100
Dose (Gy)
prompt
5 days

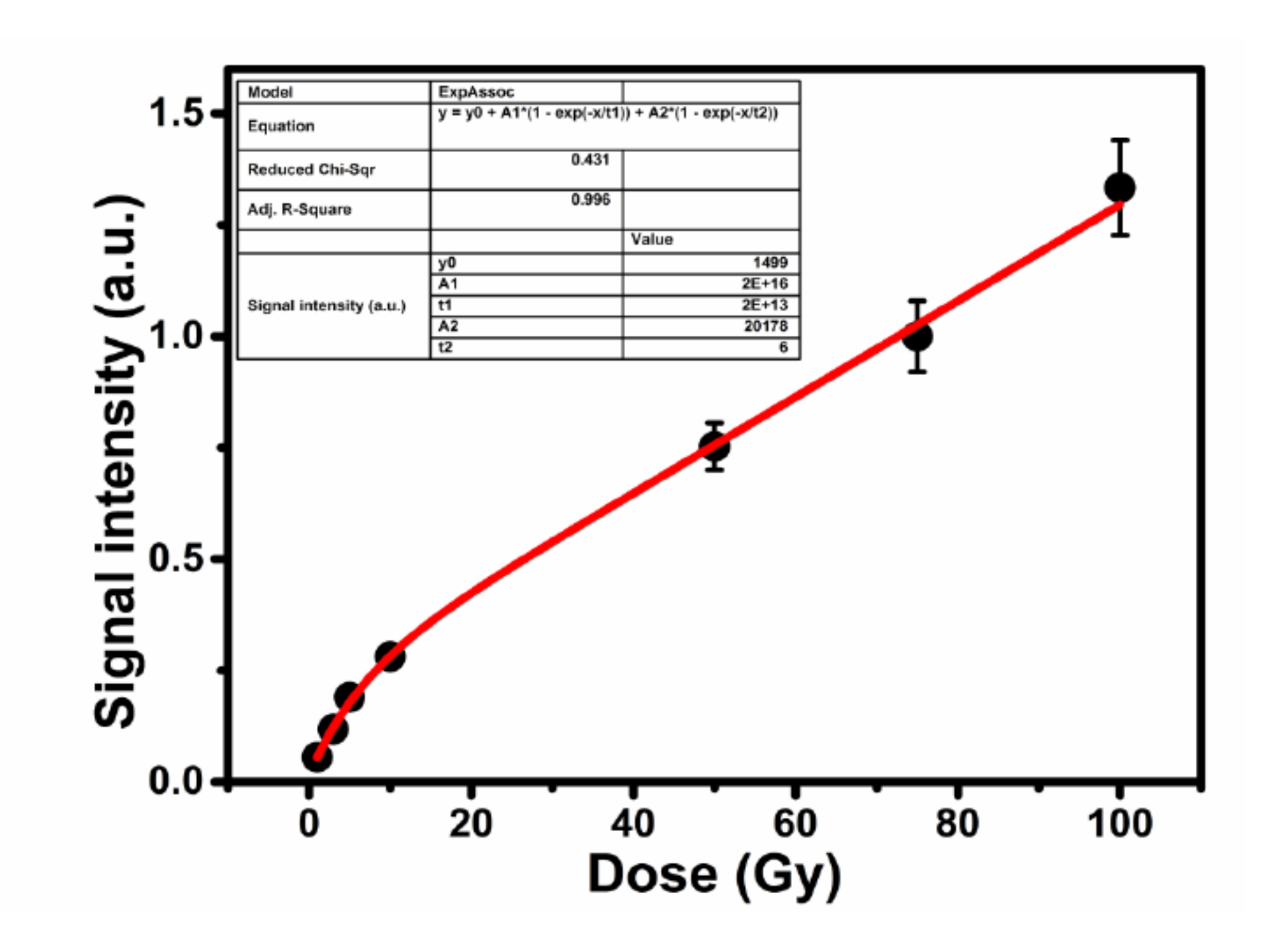




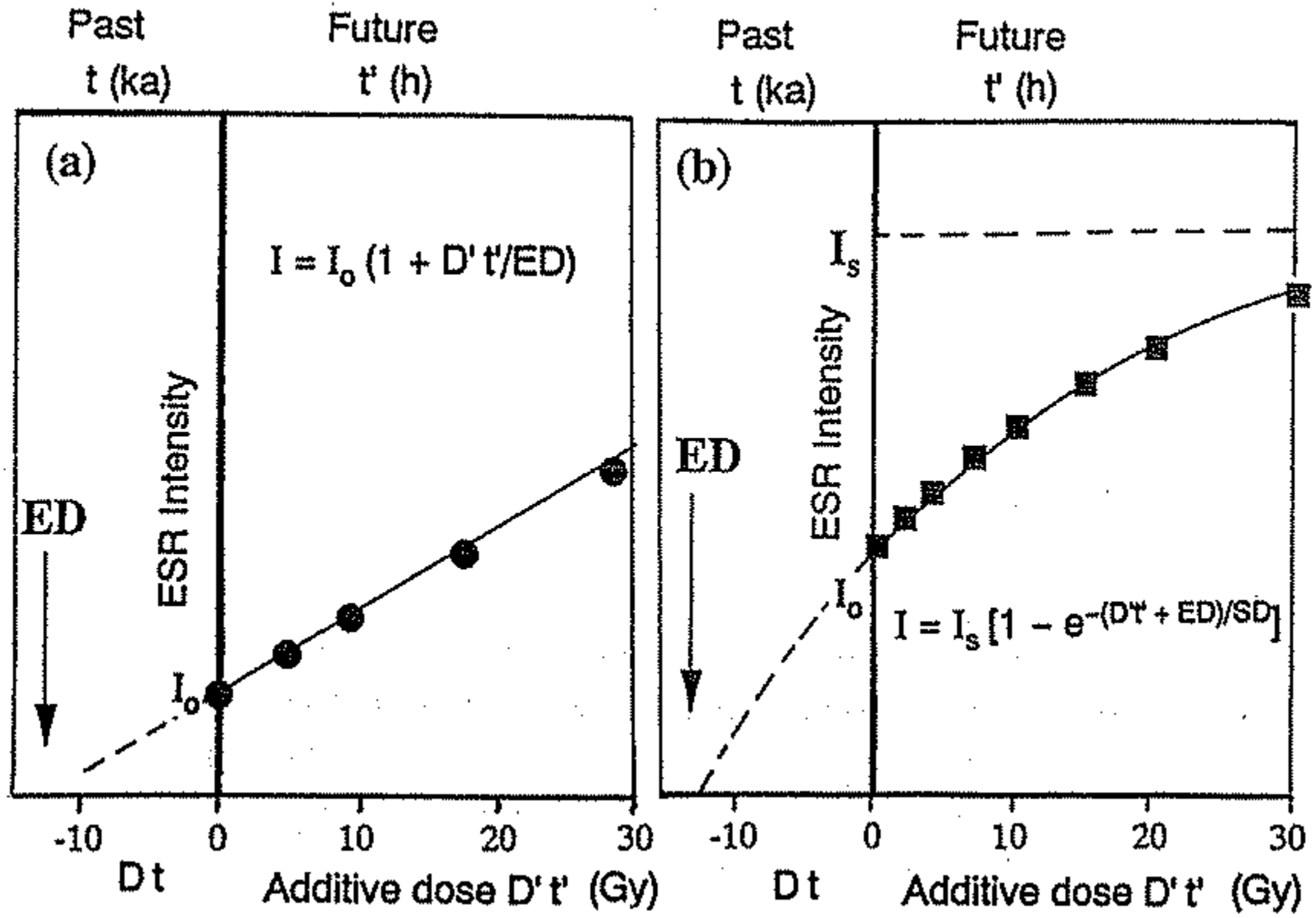
$$I = I_{max}(1 - exp(D / D_0)),$$

Nails

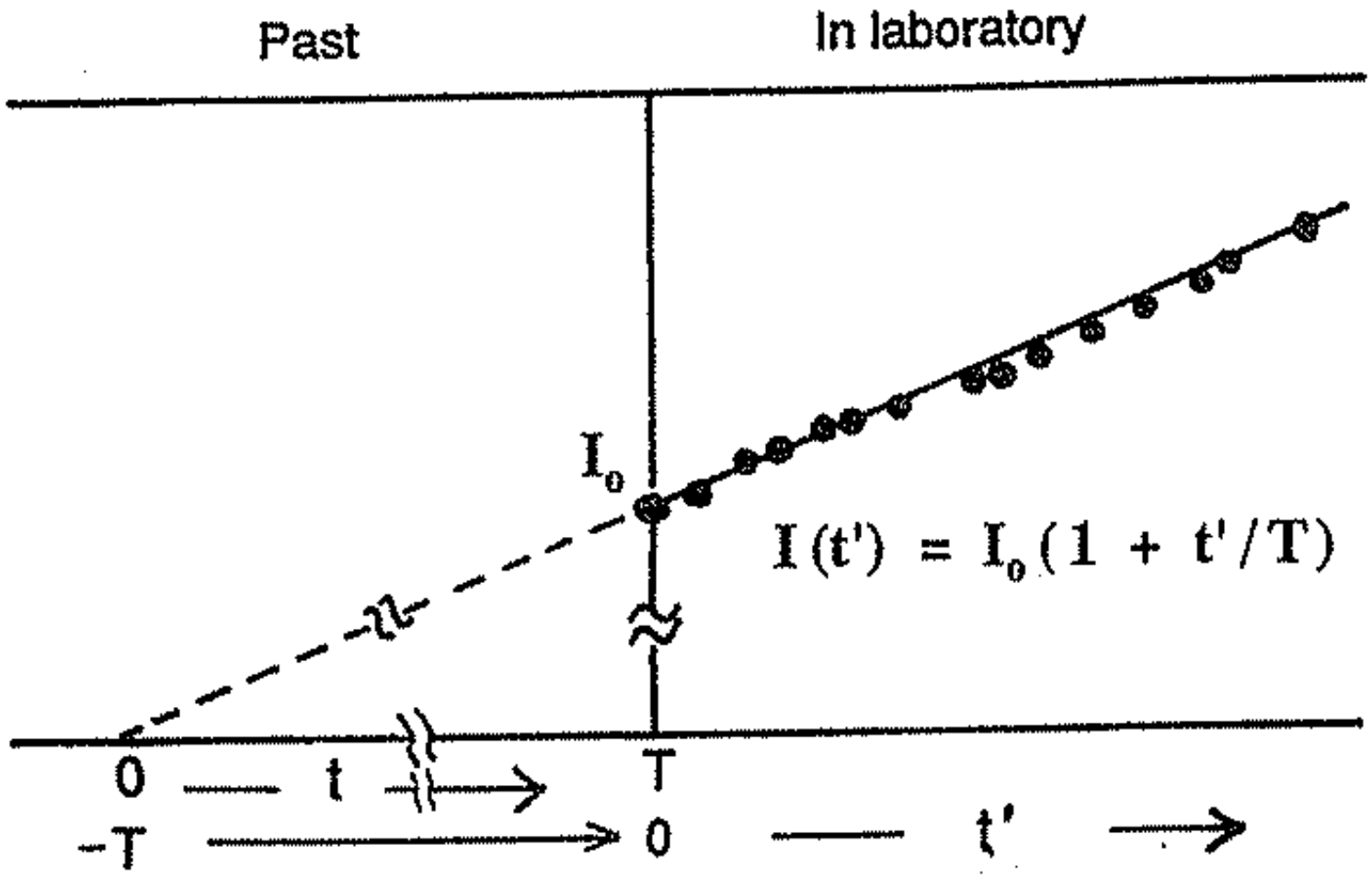

Signal Intensity (a.u)
1
0
-1
2.03
2.02
2.01
2.00
1.99
1.98
g value
0 Gy
1 Gy
3 Gy
5 Gy
10 Gy
50 Gy
75 Gy
100 Gy

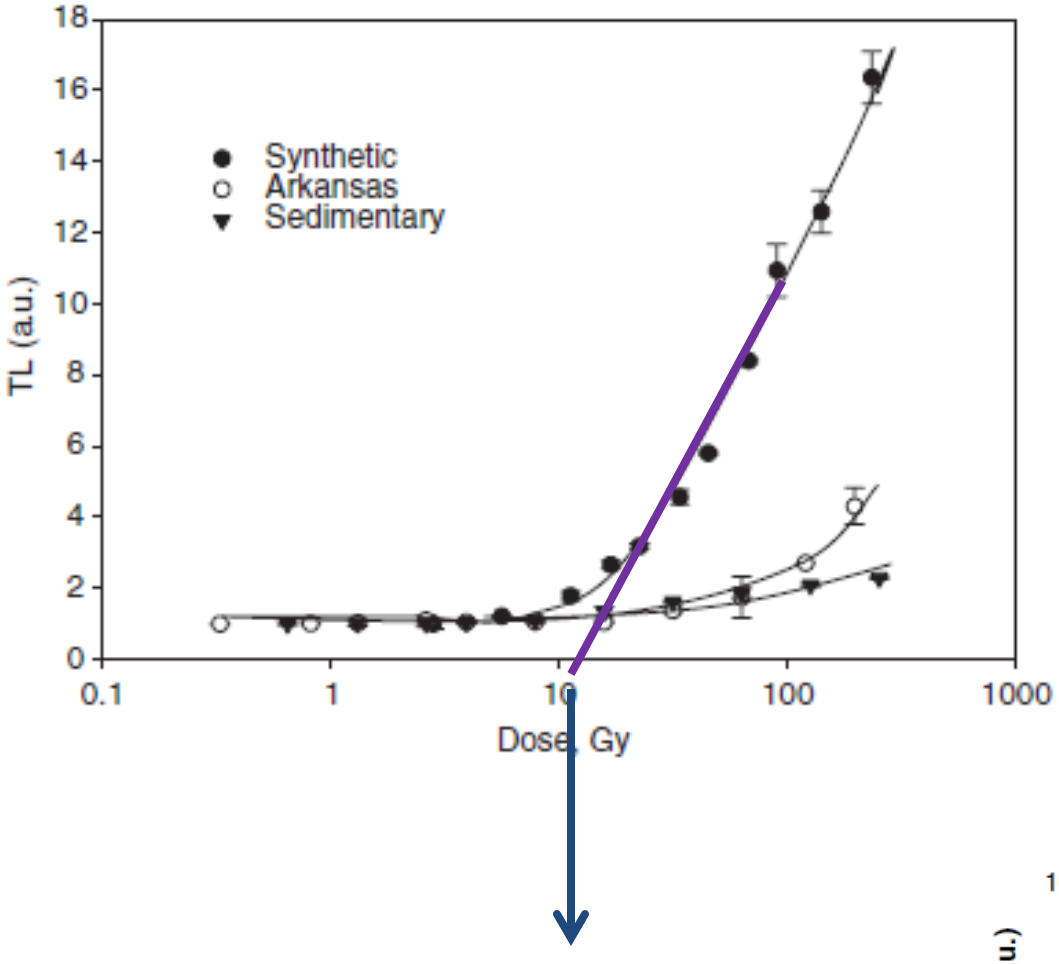

Model ExpAssoc
Equation y = y0 + A1*(1 - exp(-x/t1)) + A2*(1 - exp(-x/t2))
Reduced Chi-Sqr 0.431
Adj. R-Square 0.996
Value
Signal intensity (a.u.)
y0 1499
A1 2E+16
t1 2E+13
A2 20178
t2 6
Signal intensity (a.u.)
1.5
1.0
0.5
0.0
0
20
40
60
80
100
Dose (Gy)

Additive Dose Procedure



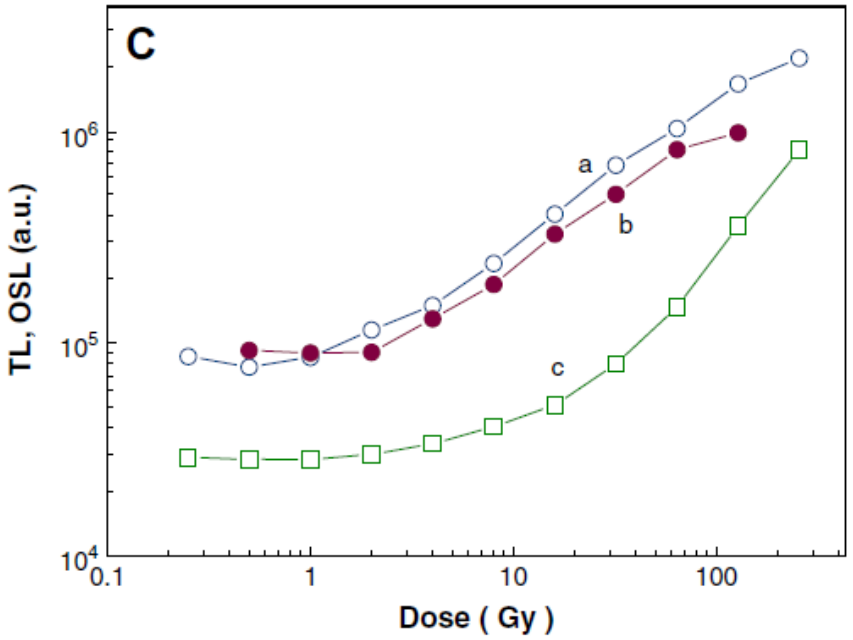
Wait and See method



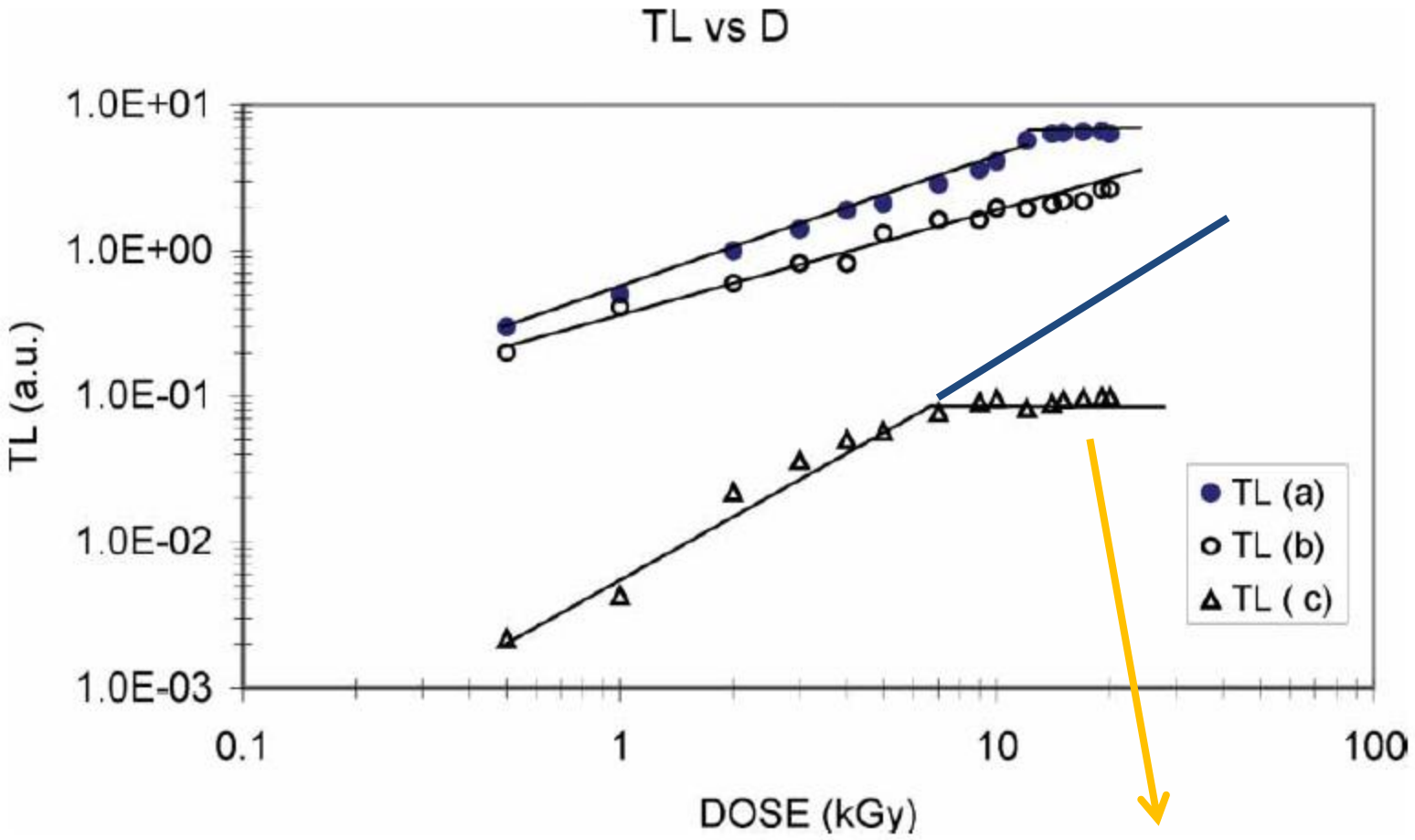


Low dose
Supralinearity

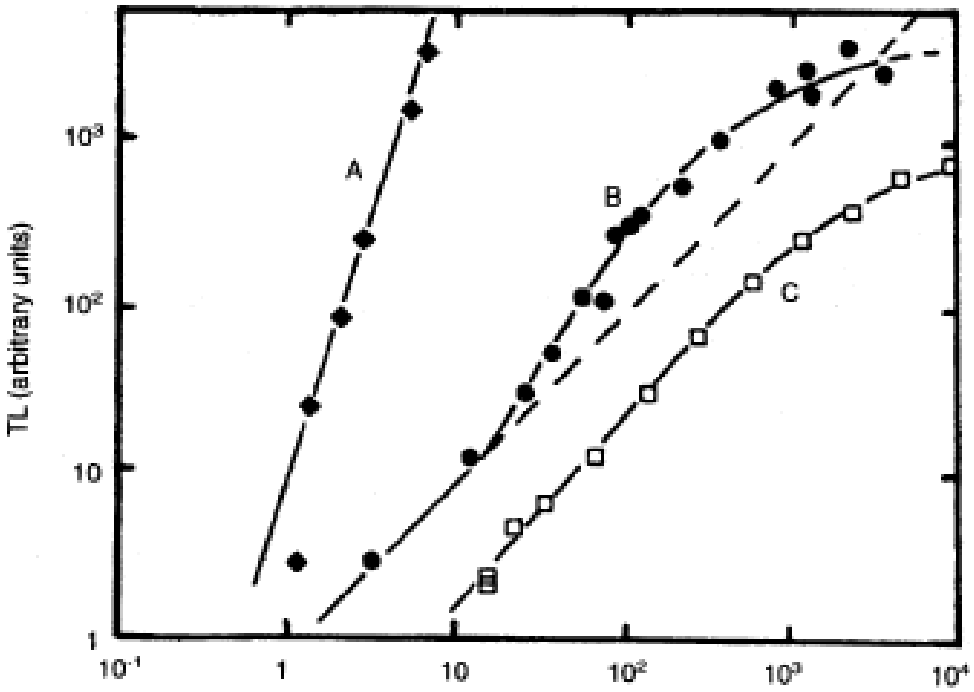
Lowest Detectable
Dose Limit Estimation



Saturation Sublinearity: no more empty traps



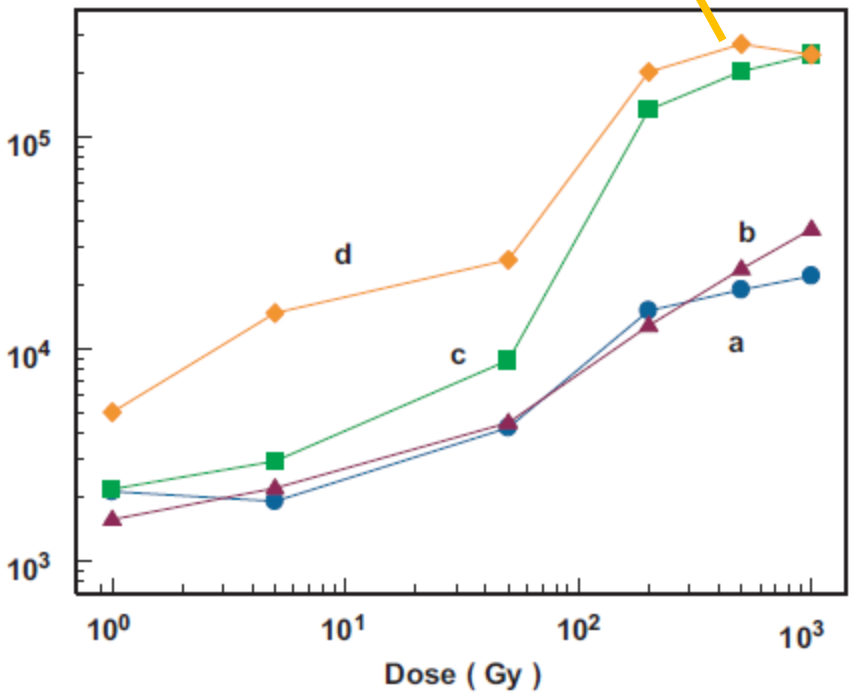
Almost Flat Dose Response

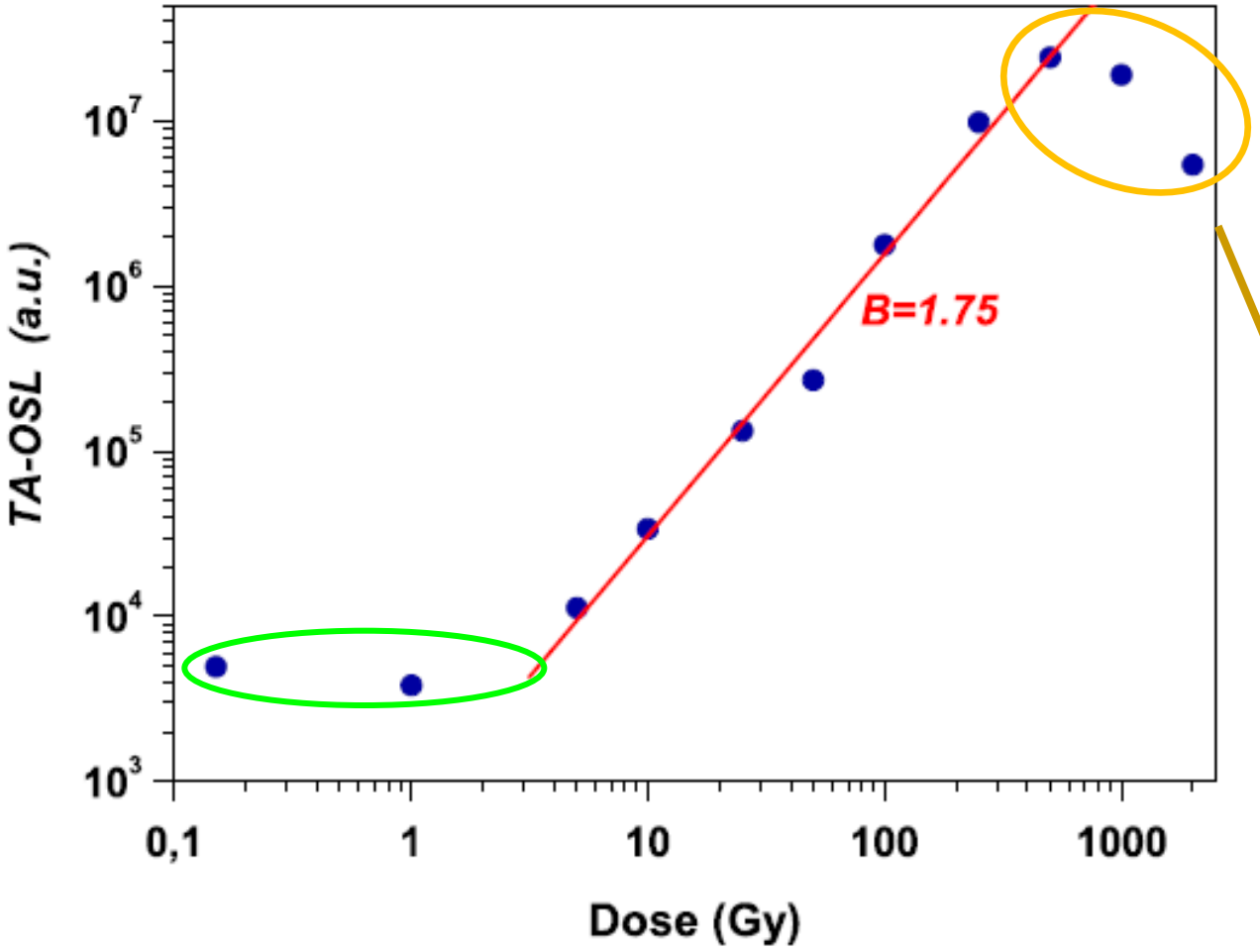


Saturation Sublinearity

Logarithmic Scale

1. ***Why?***
2. ***Misleading***





$Al_2O_3:C$

Radiation Damage

Typical Dose Response