

Radiation residue calculator

Mode to implant:

- ☒ 1. One nucleus to implant. Chose manually here
- ☐ 2. List of isotopes to implant from file
- ☐ 3. Select detector to obtain the list of isotopes stopped in

designations:

Yield = Number of atoms; N of DI = Number of Different Isotopes;
Final Time (FT) = Irradiation Time (IT) + Decay Time (DT)

238U_CoulombFission.radist N of isotopes = 490

FP_PPAC0 Refresh N of isotopes = 0

1. Chose fragment to implant:

A Element Z
229 Th 90

Alpha decay

$T_{1/2} = 2.50\text{e}+11$ sec

Implantation Rate = $1\text{e}+10$ pps

Yield of this nucleus @ Irradiation time (IT) = $1\text{e}+10$

Yield of this nucleus @ Final time (FT) = $1\text{e}+10$

Table of Nuclides

2. Irradiation (Implantation):

IT : Irradiation Time [sec] = 1

N of DI @ time (IT) = 9

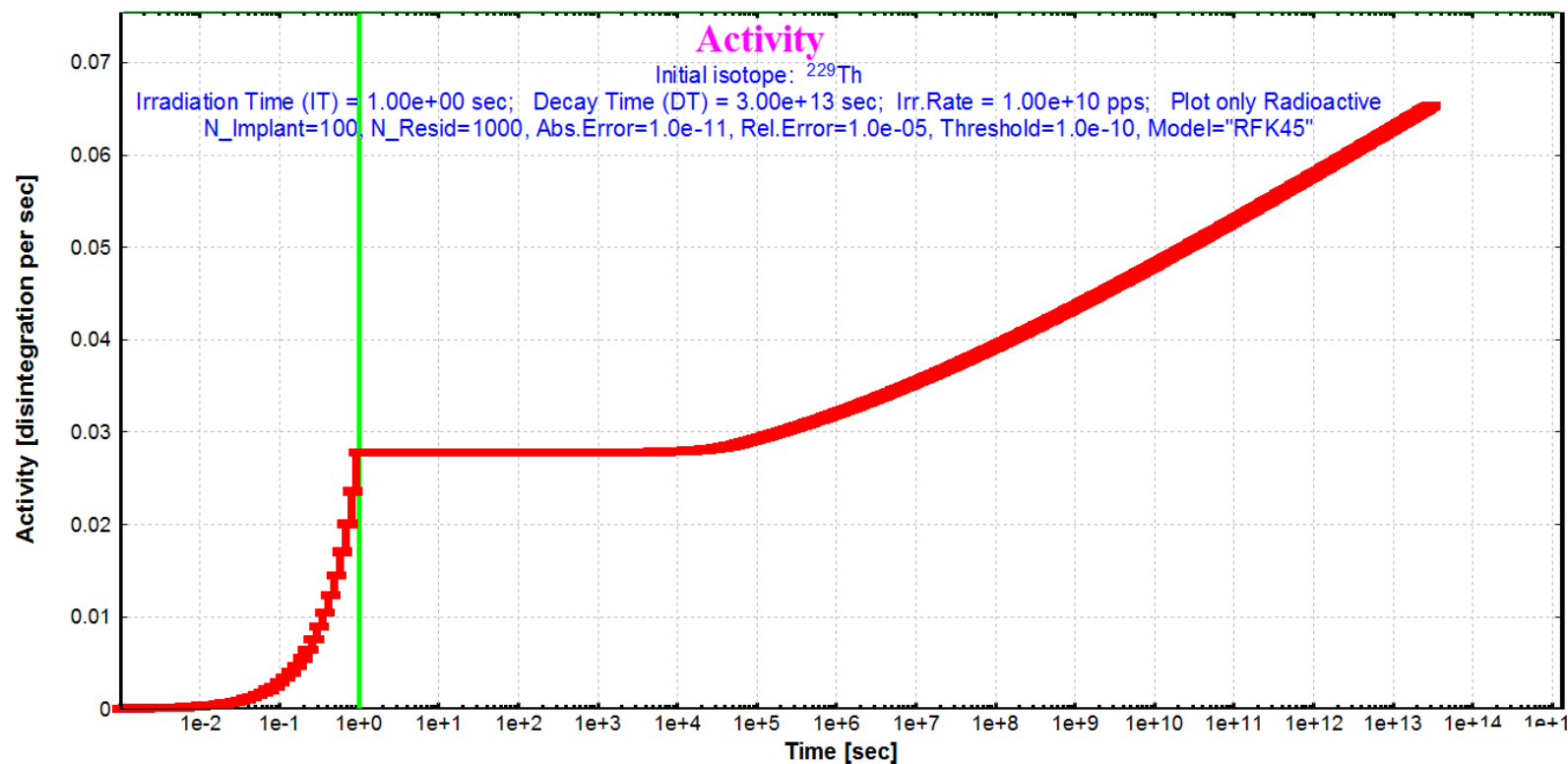
3. Radiation Residues as Function of time (DT):

DT : Decay Time after irradiation (sec) = $3\text{e}+15$

N of DI @ time (FT) = 9

Total Yield @ time (FT) = $1\text{e}+10$

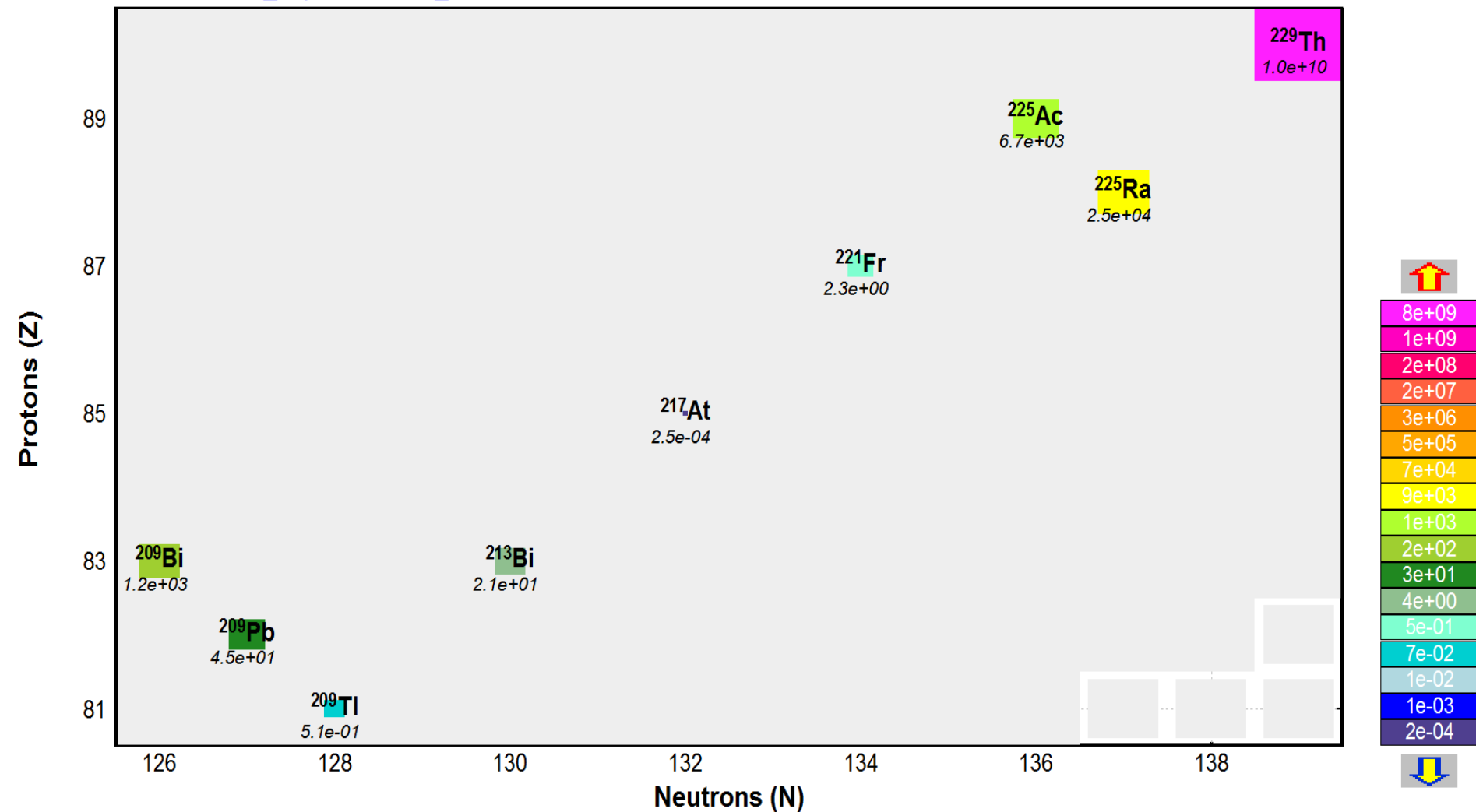
Option	Value	Description	Default value
N_Implant	100	number of points : Irradiation	100
N_Decay	1000	number of points : DECAY	100
AbsError	$1.000\text{e}-11$	absolute error tolerance	$1\text{e}-11$
RelError	$1.000\text{e}-06$	relative error tolerance	$1\text{e}-03$
Y_threshld	$1.000\text{e}-10$	Minimum yield value	$1\text{e}-10$



Radioactive decay residues

Initial isotope: ^{229}Th

Irradiation Time (IT) = $1.00\text{e}+00$ sec; Decay Time (DT) = $3.00\text{e}+15$ sec; Irr.Rate = $1.00\text{e}+10$ pps; Plot All isotopes
 N_Implant=100, N_Resid=1000, Abs.Error= $1.0\text{e}-11$, Rel.Error= $1.0\text{e}-05$, Threshold= $1.0\text{e}-10$, Model="RFK45"

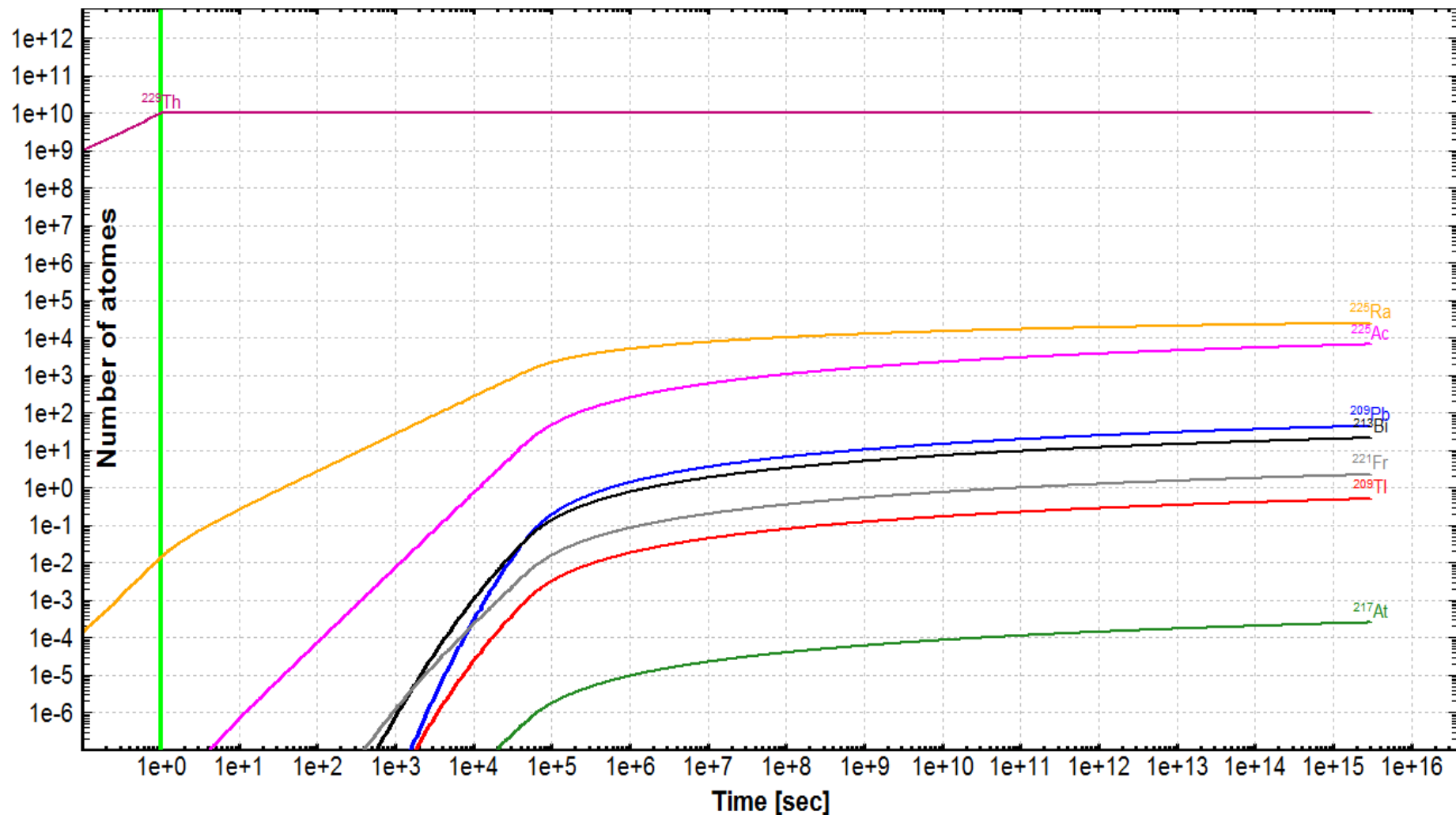


^{229}Th case : $1\text{e}8$ years decay time $\rightarrow$ RKF45 model

Evolution of Radiation Residue Yield

Initial isotope: ^{229}Th

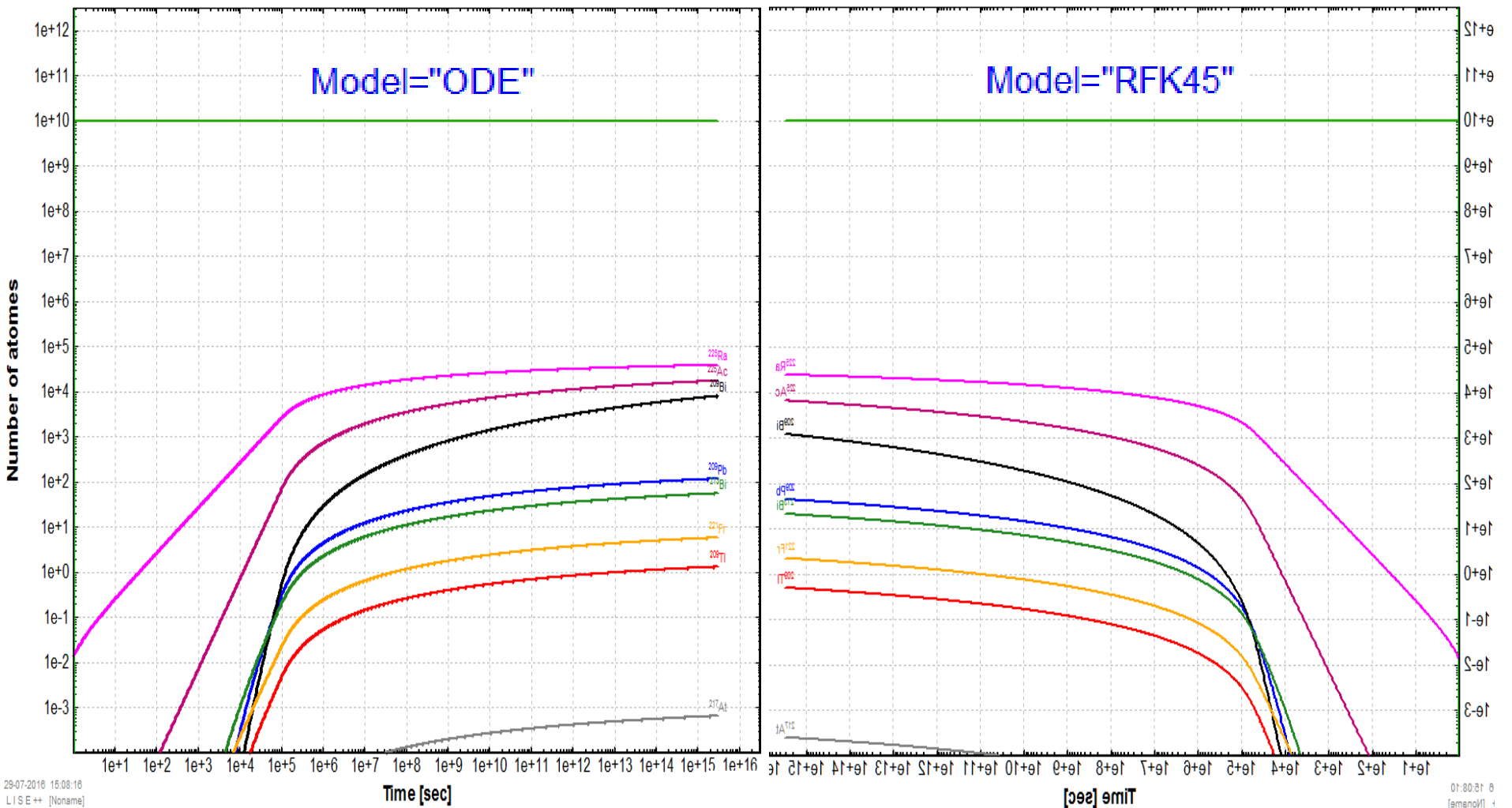
Irradiation Time (IT) = $1.00\text{e}+00$ sec; Decay Time (DT) = $3.00\text{e}+15$ sec; Irr.Rate = $1.00\text{e}+10$ pps; Plot only Radioactive
N_Implant=100, N_Resid=1000, Abs.Error=1.0e-11, Rel.Error=1.0e-05, Threshold=1.0e-10, Model="RKF45"



Evolution of Radiation Residue Yield

Initial isotope: ^{229}Th

Irradiation Time (IT) = 1.00e+00 sec; Decay Time (DT) = 3.00e+15 sec; Irr.Rate = 1.00e+10 pps; Plot All isotopes
 N_Implant=100, N_Resid=1000, Abs.Error=1.0e-11, Rel.Error=1.0e-05, Threshold=1.0e-10



Initial isotope: ^{229}Th

Irradiation Time (IT) = 1.00e+00 sec; Decay Time (DT) = 3.00e+15 sec; Irr.Rate = 1.00e+10 pps; Plot All isotopes
N_Implant=100, N_Resid=1000, Abs.Error=1.0e-11, Rel.Error=1.0e-05, Threshold=1.0e-10

