

v.9.10.341
from 08/05/16

http://lise.nsl.mscl.edu/9_10/radiation/44Ti%20from%2058Ni.lpp

Table 1. Priority isotopes for harvesting at FRIB. These isotopes were identified at the Working Group meeting in Santa Fe, NM September 30 – October 1, 2010.

Isotope	Half-life	Application
^{32}Si	160 y	Tracer; geology and botany
^{44}Ti	80 y	Medicine, astrophysics, nuclear structure
^{48}V	16 d	Stockpile Stewardship
^{67}Cu	2.6 d	Medicine
^{85}Kr	10.0 d	Astrophysics, stockpile stewardship
Eu^*		Stockpile Stewardship
^{211}Rn	14.6 h	Medicine
^{225}Ra	14.9d	Medicine, Electric Dipole Moment
^{225}Ac	10.0 d	Medicine

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.radlist" N of isotopes = 490

FP_SCI Refresh N of isotopes = 36

Press "Escape" to interrupt calculations

Total Irradiation Rate

Rate = 2.271e+06 pps

Irradiation (Implantation)

IT : Irradiation Time [sec] = 36000

N of DI @ time (IT) = 53

Radiation Residues as Function of time (DT)

DT : Decay Time after irradiation (sec) = 36000

N of DI @ time (FT) = 38

Total Yield @ time (FT) = 8.18e+10

DANGER HIGH RADIATION AREA AUTHORIZED PERSONNEL ONLY

Calculate

Options

1D : Residues as function of time

1D : Activity as function of time

2D : Final Residues (@ TF)

Quit Link

Elapsed time is 00:00:08.79 or 8.79 sec

Radiation residue calculator settings

Integration model

- ☒ ODE (ordinary differential equation solver) ISBN: 0716704617
- ☐ RK45 (Runge-Kutta-Fehlberg ODE solver)
- ☐ Numerical Recipes: ODEINT
- ☐ Numerical Recipes: STIFF
- ☐ Numerical Recipes: STIFBS

Isotopes to plot

- ☐ ALL (Stable & Radioactive)
- ☒ only Radioactive
- ☐ only Stable

Number of one-dimensional distributions 70

Make default

Option	Value	Description	Default value
N_Implant	1000	number of points : Irradiation	100
N_Decay	1000	number of points : DECA	100
AbtError	1.000e-09	absolute error tolerance	1e-11
RelError	1.000e-03	relative error tolerance	1e-03
Y_threshld	1.000e-08	Minimum yield value	1e-10

At each step for first two models, the code requires
absl local error 1 <= abs(Y1)*RelErr + AbtErr

Ok Cancel

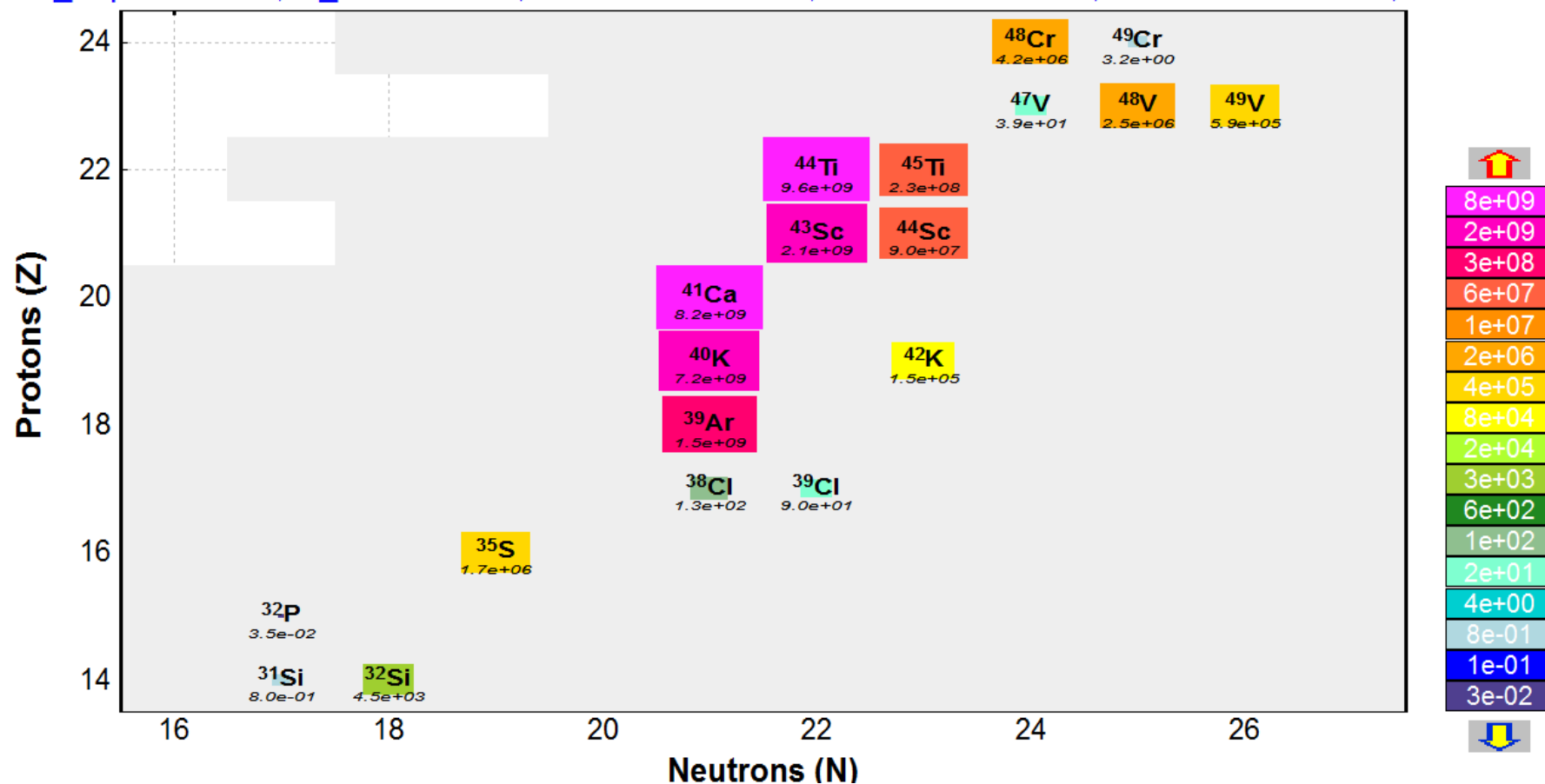
http://lise.nscl.msu.edu/9_10/radiation/44Ti%20from%2058Ni.lpp

10 hours of irradiation, 10 hours of decay : ^{44}Ti 's number of atoms is highest!

Radioactive decay residues

Implantation detector : "FP_SCI" (36 different isotopes)

Irradiation Time (IT) = 3.60×10^4 sec; Decay Time (DT) = 3.60×10^4 sec; Plot only Radioactive
 $N_{\text{Implant}}=1000$, $N_{\text{Resid}}=1000$, Abs.Error= 1.0×10^{-9} , Rel.Error= 1.0×10^{-3} , Threshold= 1.0×10^{-8} , Model="OI"

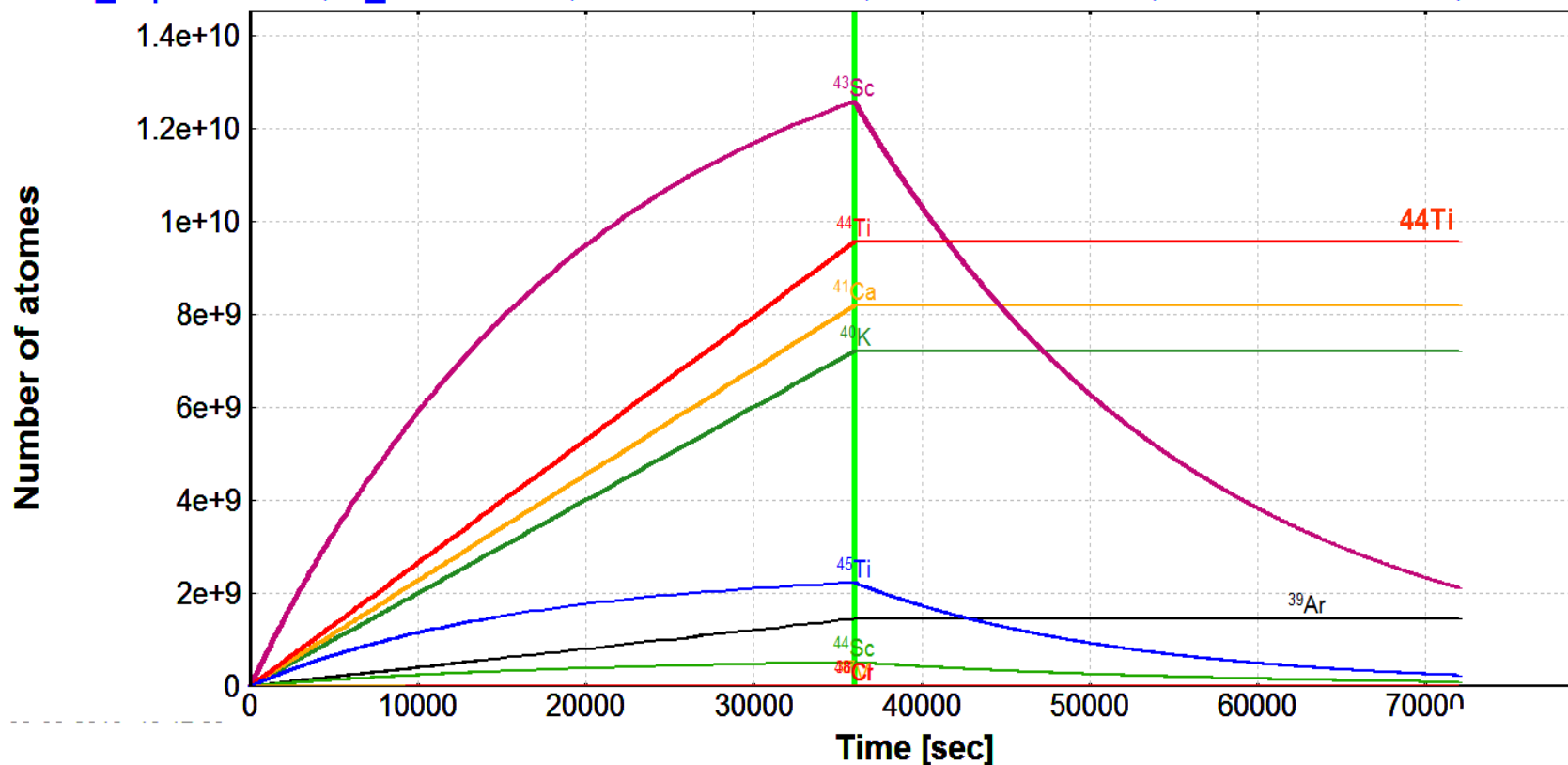


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Evolution of Radiation Residue Yield

Implantation detector : "FP_SCI" (36 different isotopes)

Irradiation Time (IT) = 3.60×10^4 sec; Decay Time (DT) = 3.60×10^4 sec; Plot only Radioactive
N_Implant=1000, N_Resid=1000, Abs.Error=1.0e-09, Rel.Error=1.0e-03, Threshold=1.0e-08, Model=



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Activity

Implantation detector : "FP_SCI" (36 different isotopes)

Irradiation Time (IT) = 3.60×10^4 sec; Decay Time (DT) = 3.60×10^4 sec; Plot only Radioactive

N_Implant=1000, N_Resid=1000, Abs.Error=1.0e-09, Rel.Error=1.0e-03, Threshold=1.0e-08, Model="OD"

