

SEPTEMBER 11, 2015



# SIROP TUTORIALS

SENSITIVITY MODULE – QUICK START EXAMPLE

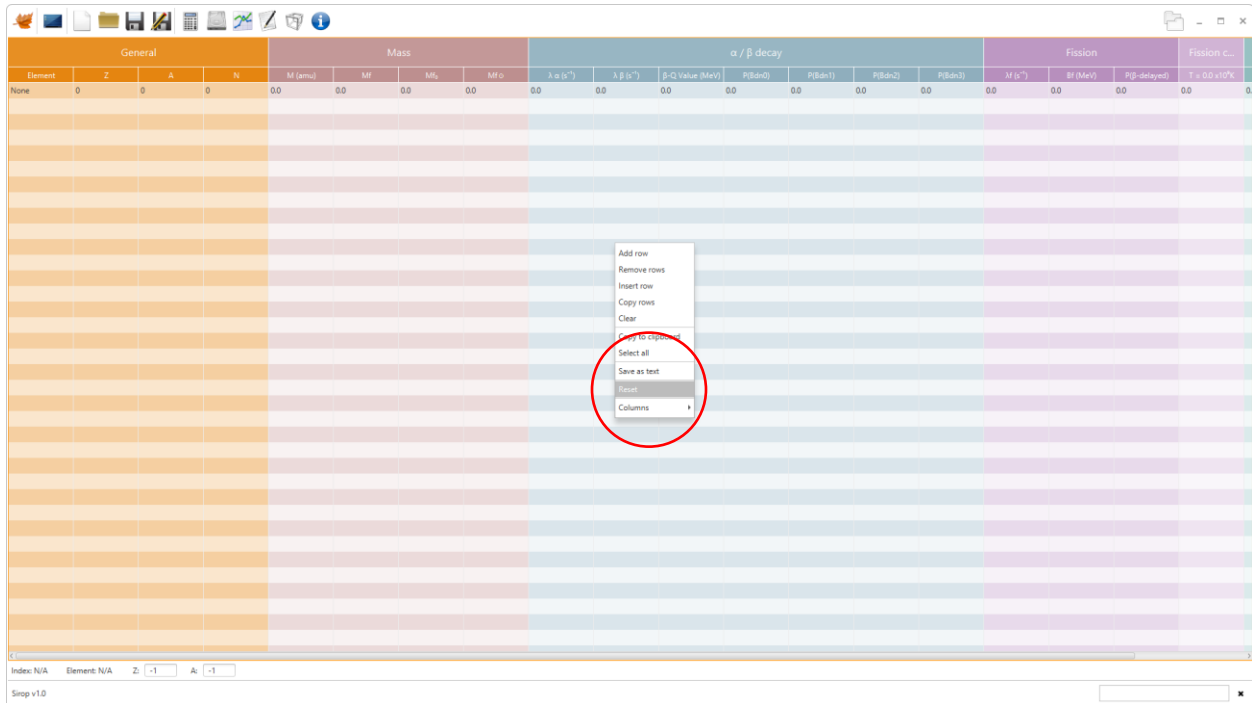
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**IMPORTANT UPDATE (July 2017):** This quick start is from an older version of SiRop (2015). A few things have changed which are necessary for the proper execution of this tutorial. These changes are in bold face in the text.

This tutorial is a quick start guide to using the sensitivity module in SiRop. It will go through the steps to set up an example r-process sensitivity run.



From the main desktop, select the “Data” module.



From the Data module, right click (control-click for Mac) and select “Reset”. This will populate the isotope table with default values.

Index: 698 Element: Fe Z: 26 A: 70

Sirop v1.0 Importing Photo-dissociation cross sections (Completed)

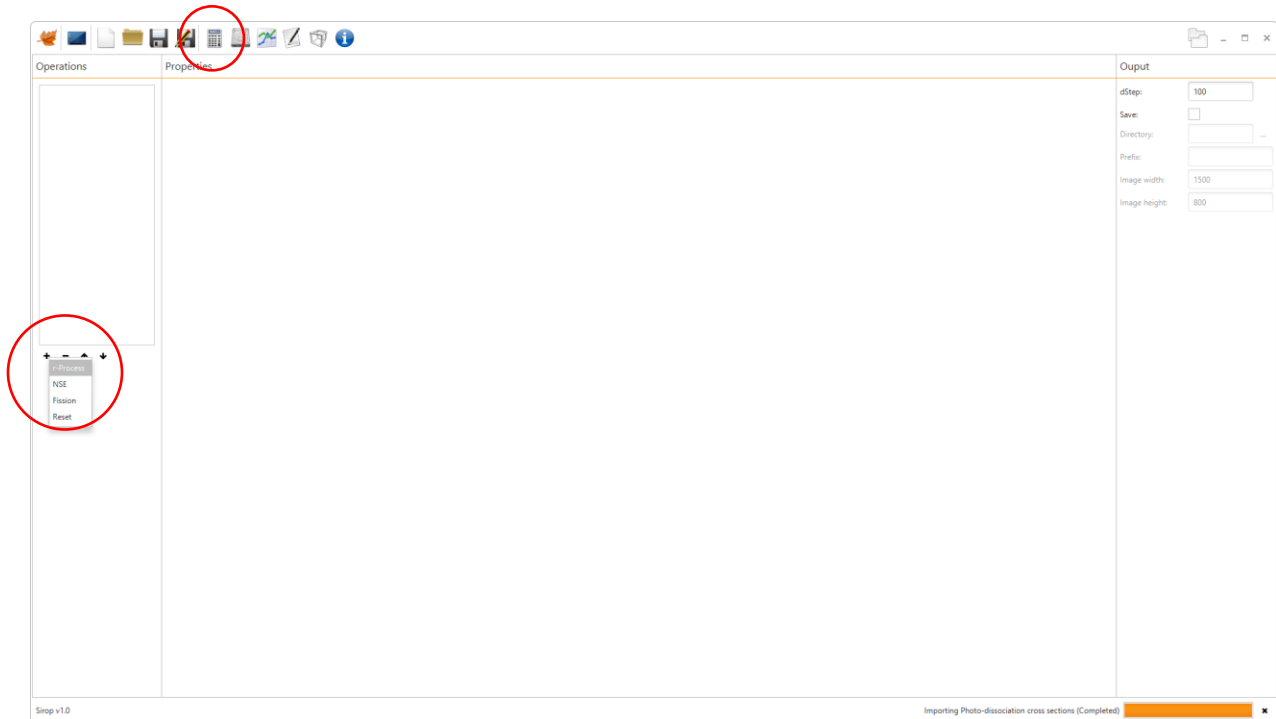
Once the table is populated, search for the isotope Z=26, A=70 in the search fields at the bottom of the table. Press enter to complete the search. The table will automatically scroll and select the desired isotope.

Index: 698 Element: Fe Z: 26 A: 70

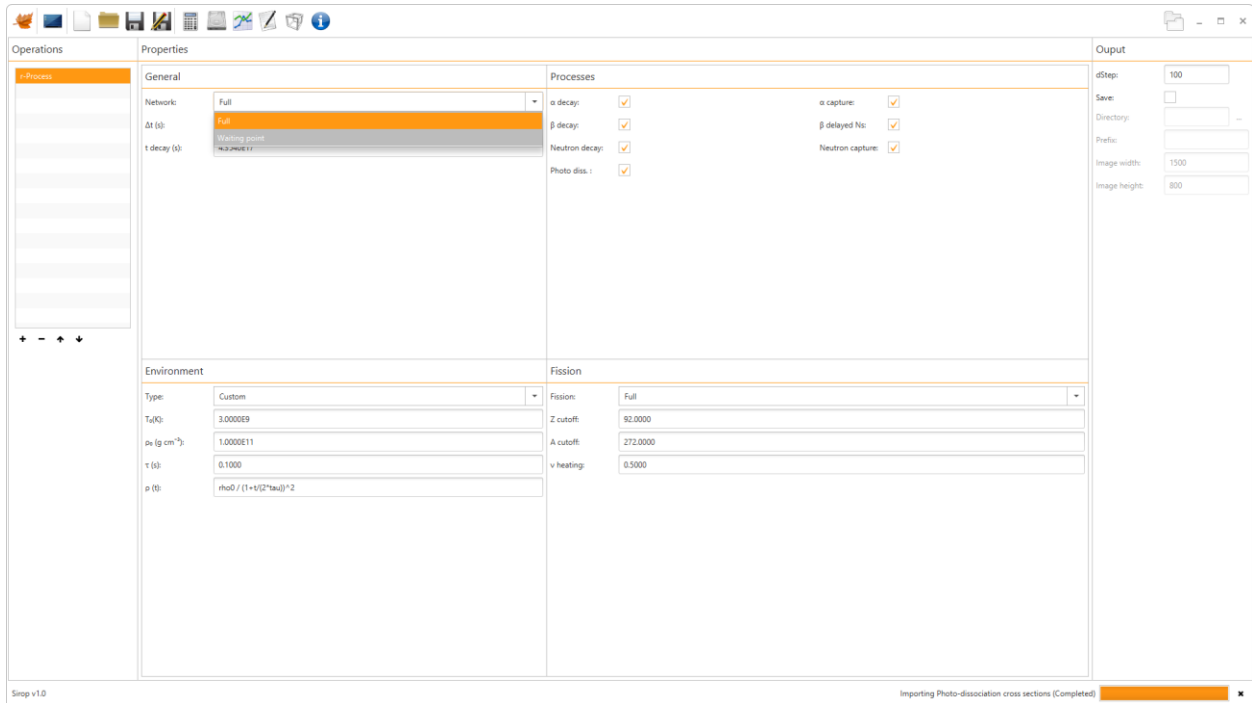
Sirop v1.0 Importing Photo-dissociation cross sections (Completed)

Double click on the Mf0 (initial mass fraction) field of the selected isotope (Z=26, A=70). Enter 0.5 as an example. **UPDATE:** In the newest version of Sirop the column header “Mf0” has been replaced with “X0”.

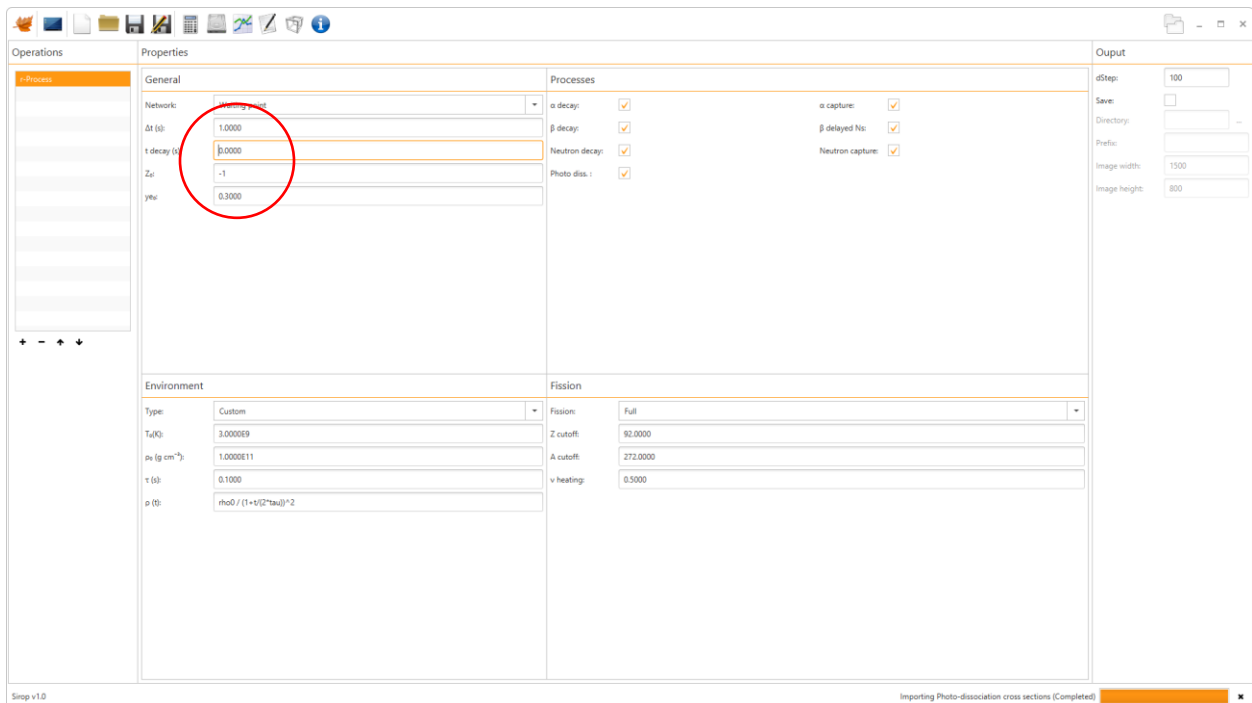
Display the “Code” module by clicking on the calculator icon in the quick launch bar. Alternatively you can return to the desktop and select the “Code” module from there.



From the Code module, add a new “r-process” operation to the operations list by clicking on the “add” icon.

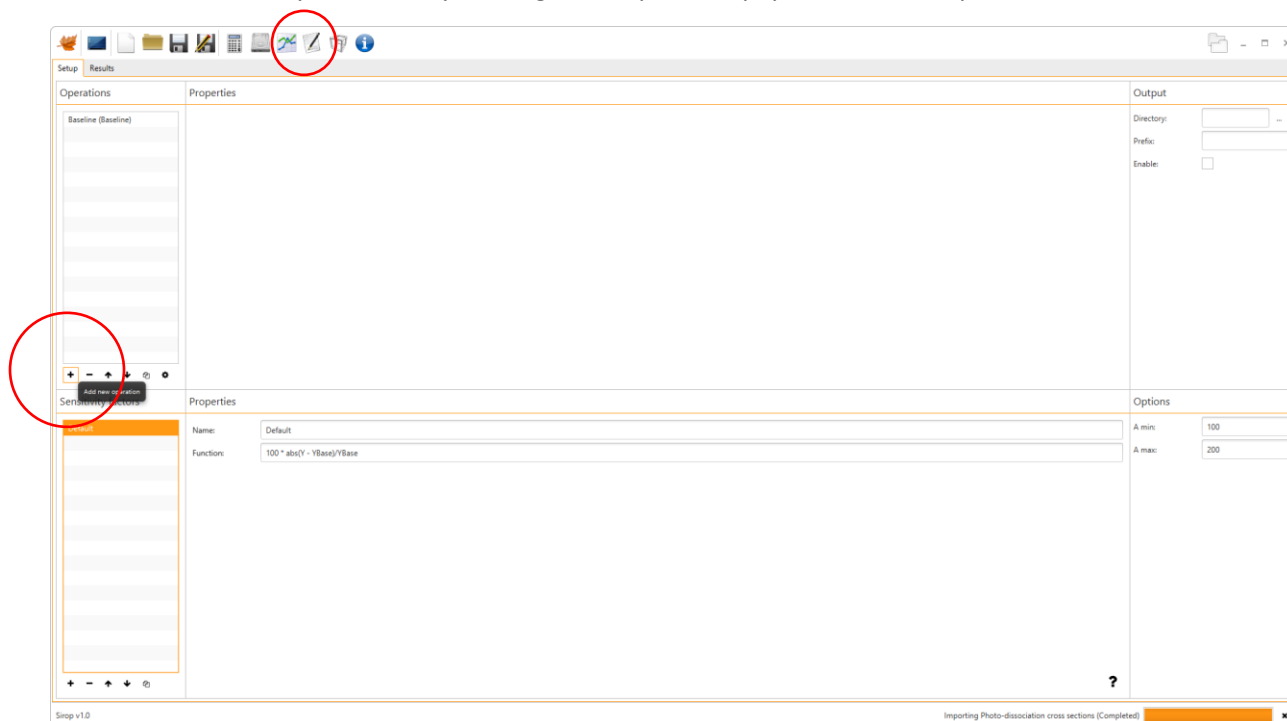


Selecting “Waiting point” from the network drop down box.

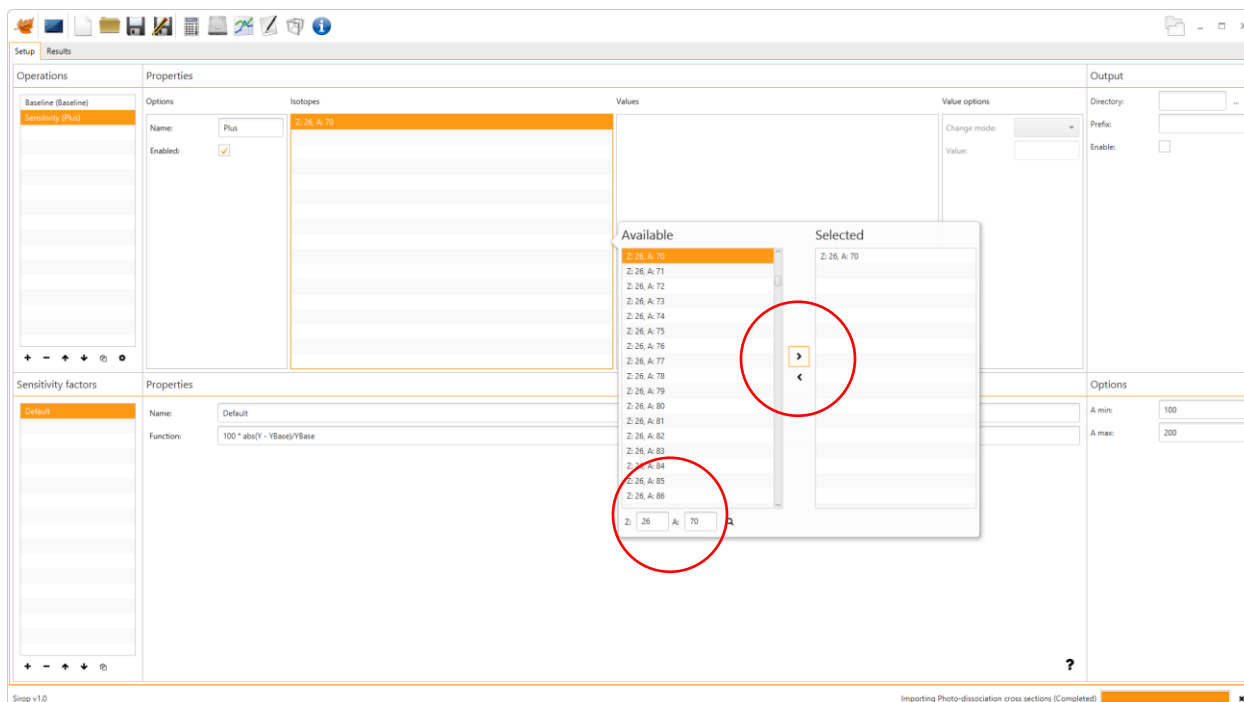


Set the “t decay” field to 0 (to speed up the calculations for the demonstration).

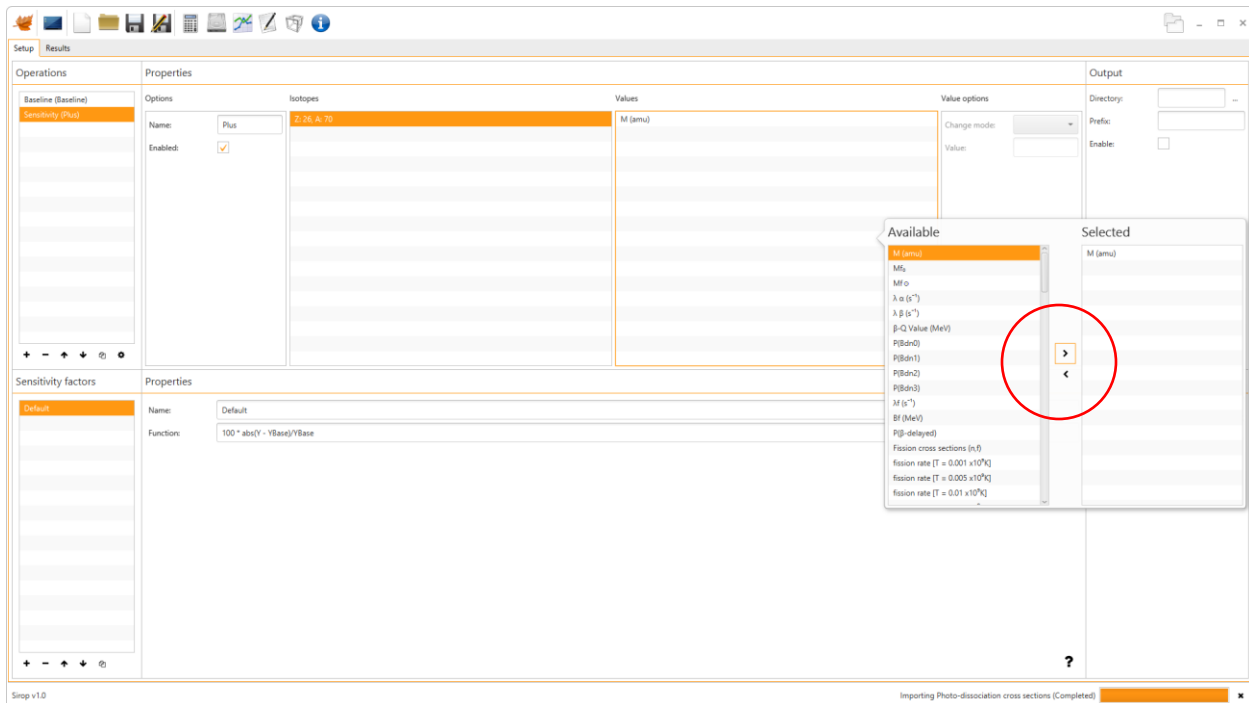
Select the “Sensitivity” module by clicking on the pen and paper icon in the quick launch bar.



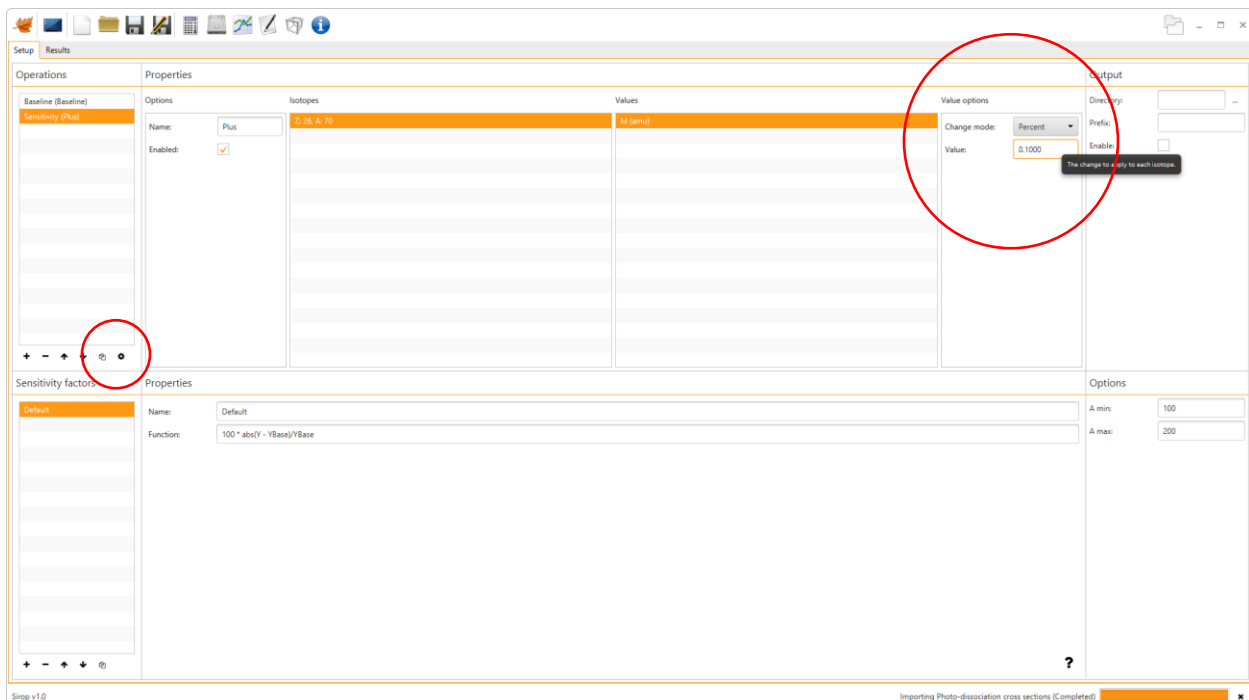
From the Sensitivity module, select a new operation by clicking the “add” icon.



Right click on the isotopes list to display a list of isotopes you can change. Scroll down to isotope Z=26, A=70 (or use the search fields at the bottom of the list). Click on the right arrow to move the isotope to the selected list.




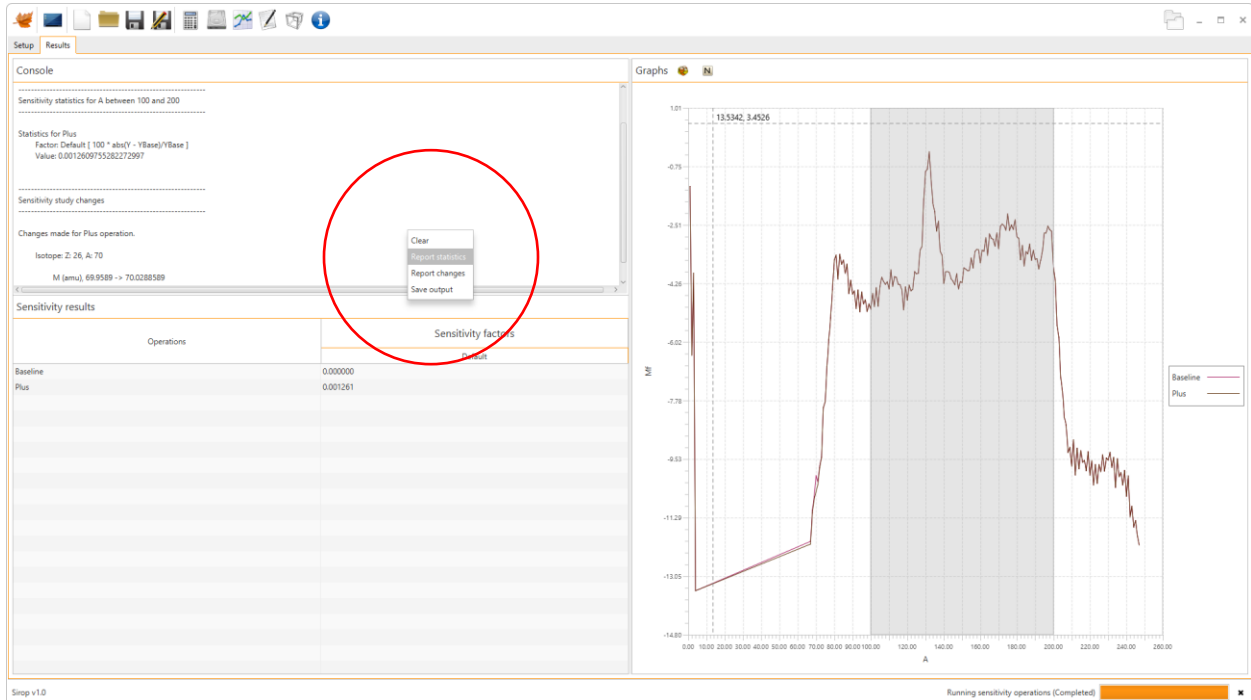
**UPDATE: In the newest version, one must first create a “Group” but clicking on the “plus” icon at the bottom of the group panel (not shown here). Once a group is created, select it and you can proceed as usual. Right click on the “Values” list to display a list of isotope properties that can be changed for the sensitivity study. Select “M (amu)” from the list and press the right arrow button to move it to the selected list.**



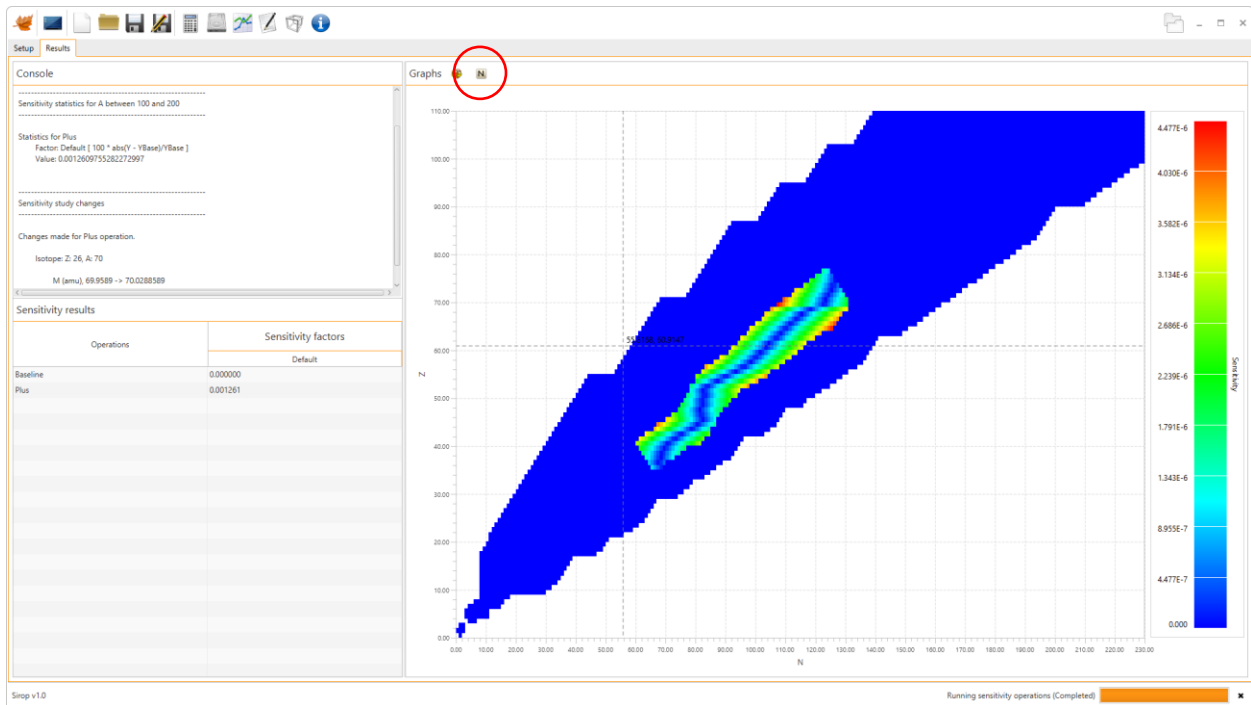


Click on the “M (amu)” value to show the options in the “Value options” pane. Set the change mode to “Percent” and the “Value” to 0.1. (This will change the mass of isotope Z=26, A=70 by +0.1%)

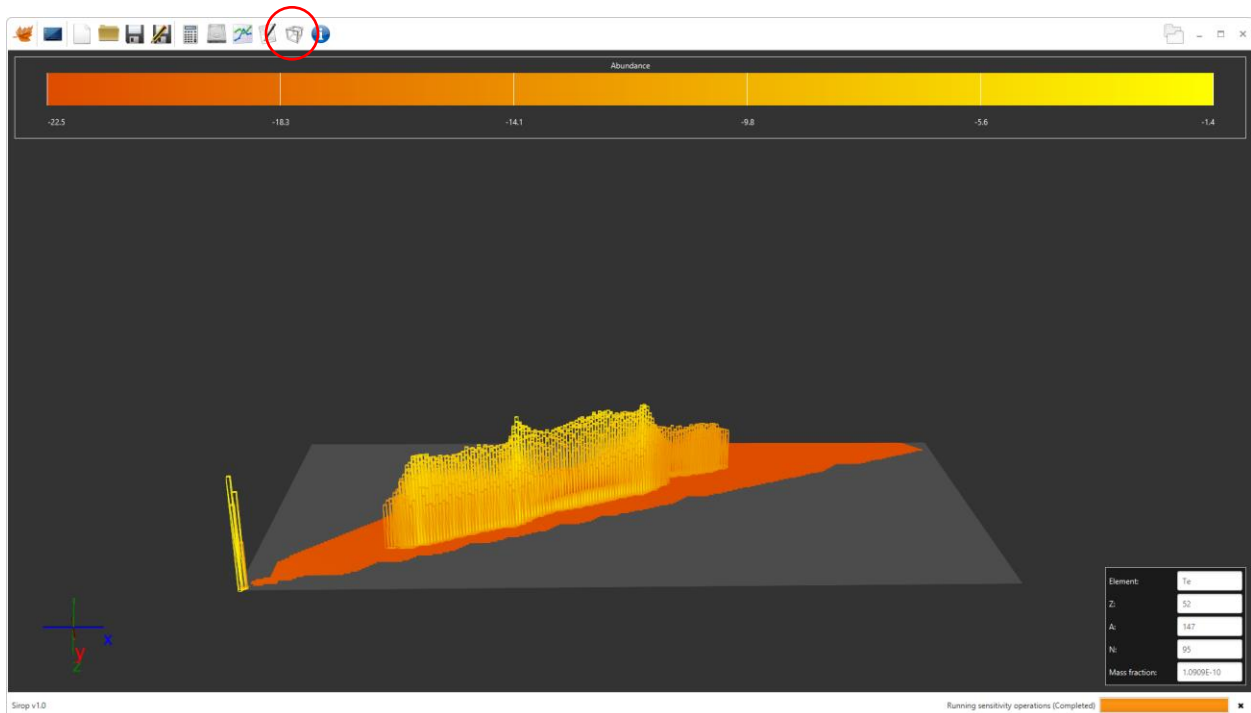
Once the setup is complete, press the cog icon  to start the sensitivity study. Wait until all processes are complete. The status can be observed in the bottom right corner of the program.



Click on the “Results” tab in the Sensitivity module to display the output from the current sensitivity run. Right click on the “Console” pane to display statistics and a summary of what was changed. The results table will also show the resulting sensitivity factors that can be defined in the setup tab.

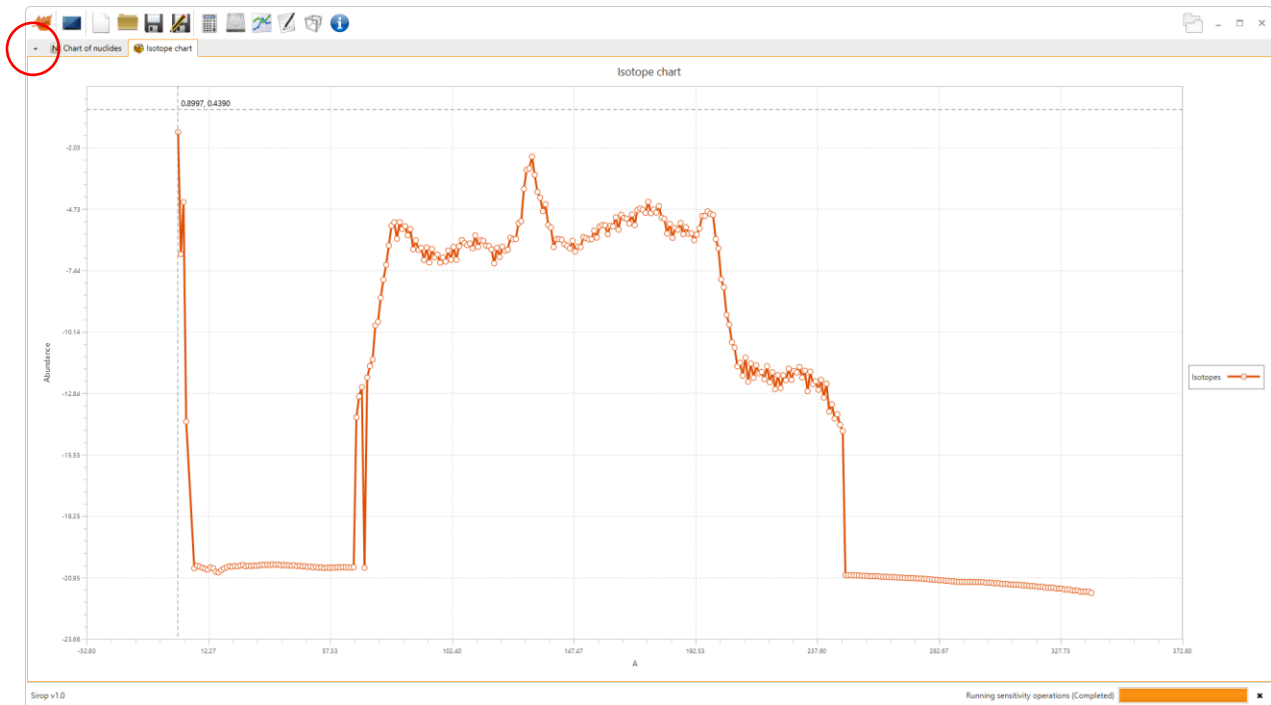


Selecting the N icon from the Graphs title bar will show a color coded chart of nuclides. The colors of each isotope represent its sensitivity.

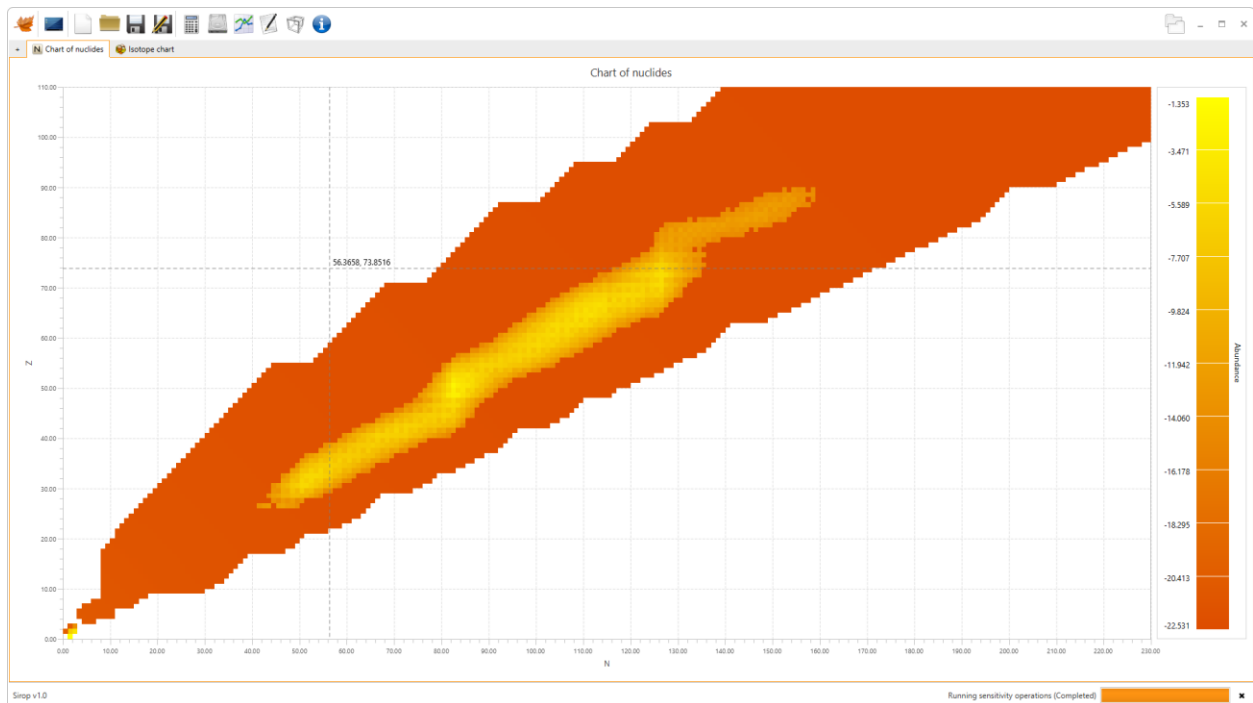


Select the cube icon from the quick launch bar to show the 3D module. This is an interactive 3D chart of nuclides.





Select the graph icon from the quick launch bar to display the graphs. You can select from three different kinds by pressing the “plus” icon in the top left. Below is an example isotope graph.



Another type of graph is the chart of nuclides which is color coded according to abundance or mass fraction. Simply right click on the axes, or the legend to change properties.