

Theremino MCA IdentFeature

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Identifier class in Theremino MCA have next features:

1. Gamma spectrometry or XRF analyser – for XRF select XRF checkbox on top-right corner of Theremino window
2. List of Isotopes in GS mode or Elements in XRF mode in top-right corner of Theremino window. Selecting item from list (combobox) showing markers with relevant energies for isotopes in GS mode and showing markers with relevant energies and atom shell label for XRF mode.
3. Click on spectrum graph and clicking on Identify button showing isotopes/elements which suit or are close to selected energy with tolerances set in \Extra\ IdentSettings.txt file.
4. Semi-auto identification – for analyzing more than one energy with POI (Energy Point Of Interest)

Files needed for identifier features (in ThereminoMCA root):

\Extra\ IdentSettings.txt

\Extra\ Isotopes_Energy.txt

\Extra\XRFTable.txt

Folder needed (in ThereminoMCA root):

\IdentReport\

How identification feature work

Main thing for identification is to get and set right tolerance settings in IdentSettings file (explained in section below in this document).

This settings are important to calibrate and set for every probe you are using in process.

If you make all calibration for probe you'll make narrow range for suit and wider for close to.

So, last settings need to show only isotopes matching selected peak and close to will show some close to selected peak.

One example of isotope/elements showed by energy selection:

if you have next six isotopes:

iso1 at 107keV

iso2 at 92 keV

iso3 at 88 keV

iso 4 at 115 keV

iso5 at 45 keV

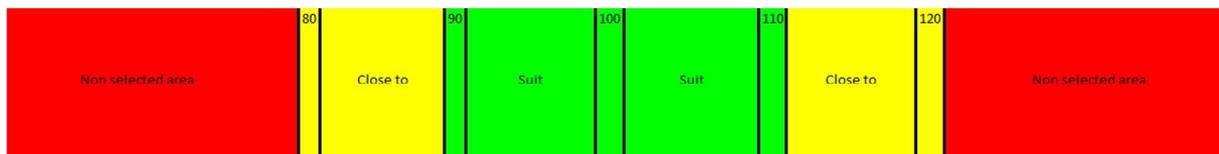
iso6 at 1.21 MeV

You select 100 keV and tolerances are: suit= ± 10 and close= ± 20 .

In first list you get 90 keV-110 keV = iso1, iso2 – **Green color**

In second list you get 80 keV-90 keV and 110 keV- 120 keV = iso3, iso4 – **Yellow color**

Isotopes iso5 and iso6 are not showed because it doesn't match tolerance selection – **Red color**



Semi Auto Identification – multi point identification

To use Semi Auto Identification select menu button "Semi Auto Ident" under menu item „Isotope Identifier (by Tomy 9A5TOM)“. Semi Auto Ident can be used only when Isotope identifier option (tool menu) is turned on (checked).

New window is opened XRF or GS "Semi Auto Identification" (depending by current ident mode selected by XRF check box). New window appeared over main window.

Now select energy with left click on graph (read selected energy below graph) and click button "Add Energy POI" on top-right corner of main form. Add all energy POI you need for identification. Selected energy POI are marked on graph in „Dark Violet“ color.

After marking all energy POIs click button "Show Report".

If you need fine tuning you can change tolerance in text box clicking on it and change with up/down arrows or writing value directly (no decimals). More about tolerances in section below this text.

Now you can click button "Show Report" again and view new results.

Report showing: POIs, time created, tolerance, elements with number of POIs match to element and possible number of peaks for that element, matching POI-element-peak.

In results can be reported for some of elements that have more POIs than are really selected - this is because in one POI and its tolerance are more than one peak energy for that element.

If you want to save report click button „Save Report“. Report are saved in path „application\IdentReport\“ with name reported with „Message box“ after saving. File name contains GS or XRF process indicator and file stamp.

To make another semi auto identification click „Reset POI“ button or reopen „Semi Auto Ident“ window.

When finished close „Semi Auto Ident“ window.

Semi auto ident – tolerance settings

Energy tolerance used in semi auto ident are used from "suit to" settings for selected mode which are loaded from file \Extra\IdentSettings.txt. During process of semi auto ident you can change temp tolerance to fine tune results. If you want to change "suit to" tolerance note tolerance settings and change it in file \Extra\IdentSettings.txt file.

Note:

Tolerance value in semi auto ident text box is expressed eV (+/-) with no decimals).

Note that tolerances in settings file for GS (Isotope) are expressed in **keV** and for XRF are expressed in **eV** (read instructions for settings file).

After changing settings in IdentSettings.txt file you need to restart program to load new settings.

Settings properties of identification features in appropriate files:

\Extra\ IdentSettings.txt

Tall settings for tolerances and atomic shell visibility can be set on the window of „Identification tool“.

This file contains settings for tolerances (Gamma Spectrometry suit, Gamma Spectrometry close to, XRF suit, XRF close to) and visibility for shell energies of elements.

```
IsotopeSuitTolerance,10000
IsotopeCloseToTolerance,20000
XRFSuitTolerance,500
XRFCloseToTolerance,1000
Kalpha1,1
Kalpha2,1
Kbeta1,1
Lalpha1,1
Lalpha2,1
Lbeta1,1
Lbeta2,1
Lgamma1,0
Malpha1,0
```

First four lines are settings for tolerances for identified energies with button IDENTIFY. Tolerances can be after comma (,) and can be in range between 0.01 and 200000 with decimal dot (.) and two decimal places if needed. Tolerances GS (Isotope) and for XRF (elements) are expressed in **eV**.

Example for Gamma Spectrometry:

IsotopeSuitTolerance,5000

IsotopeCloseToTolerance,10000

For example above Isotope suit tolerance is 5keV and for close to tolerance is 10keV.

Last nine lines are settings for showing shells. Value 1 is show in application and value 0 is do not show in application.

Example:

Lbeta2,1

Lgamma1,0

Lbeta2 shell will be showed in application

Lgamma1 will be unreachable in application

For example above Lbeta2 will be loaded and showed in application and Lgamma1 will not.

\Extra\ XRFTable.txt

This file contains some informations about elements (shell and energies) and some informations for internal app use. Energies are expressed in **eV**.

Lines in file looks like in next table:

1,0,Au,Ma1,2122.90,2122.90
1,1,Au,La2,9628.00,9333.00
1,0,Au,La1,9713.30,9713.30
1,0,Au,Lb1,11442.30,11442.30
1,0,Au,Lb2,11584.70,11584.70

Separator in table is comma (,) and separator for decimal places are dot (.).

Examples (first two lines) from table above:

1,0,Au,Ma1,2122.90,2122.90

- First column value 1 is for internal use (NO USER CHANGE)
- second column value 0 show that this element use energy setted by default (CAN BE CHANGED BY USER IF ENERGY CHANGED)
- third column value is element symbol in this example Gold (NO USER CHANGE)
- fourth column value showing that this line is for Malpha1 shell (NO USER CHANGE)
- fift column value is energy default value (NO USER CHANGE)
- sixth column value is value showed in application (CAN BE CHANGED BY USER)

1,1,Au,La2,9628.00,9333.00

In line above you can see 1 in second column which mean that energy changed by the user in sixth column.

So, user can change energy for element/shell in sixth column and in that case need to change second column value in 1. Fifth column is for reverting user defined energy to default energy (in this moment by hand). Another four lines are not allowed to change.

This is for helping user to make it's own collection of energies with regard to „source“ used in XRF process.

NOTE:

If migrating to new version of application backup those three files and replace files from new version to preserve settings in edited files.

In case of any changes in those files will be noted with additional explanation how to migrate to new version.

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