

# enrimo

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## NAME

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enrimo - Investigate the influence of an enriched Mo isotope

## SYNOPSIS

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```
perl enrimo.pl [--materials=mo_mat ...] [--isotope=mo_isot]
               [--enri_lev_type=frac_type] [--enri_lev_range=frac_range]
               [--min_depl_lev_global=enri_lev] [--depl_order=option]
               [--inp=fname] [--out_path=path] [--out_fmts=ext ...]
               [--projectiles=particle ...]
               [--verbose] [--nofm] [--nopause]
```

## DESCRIPTION

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This Perl program generates datasets for investigating the influence of an enriched Mo isotope on its associated Mo material, Mo element, and companion isotopes.

The following quantities, as functions of the enrichment level of the Mo isotope to be enriched, are calculated for a Mo material:

- Amount fractions and mass fractions of Mo and O isotopes
- Mass fractions of Mo and O elements
- Mass and number densities of the Mo material, Mo and O elements, and their isotopes
- Density change coefficients (DCCs) of Mo and O isotopes

## OPTIONS

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Multiple values are separated by the comma (,).

```
--materials=mo_mat ... (short: --mats, default: momet)
all
```

```

    All of the following mo_mat's.
momet
    Mo metal
mo02
    Mo(IV) oxide (aka Mo dioxide)
mo03
    Mo(VI) oxide (aka Mo trioxide)

--isotope=mo_isot (short: --isot, default: mo100)
    Mo isotope to be enriched.
mo92
mo94
mo95
mo96
mo97
mo98  <= Mo-98(n,g)Mo-99
mo100 <= Mo-100(g,n)Mo-99, Mo-100(n,2n)Mo-99, Mo-100(p,2n)Tc-99m

--enri_lev_type=frac_type (short: --type, default: amt_frac)
    The fraction type to refer to the enrichment level.
amt_frac
mass_frac

--enri_lev_range=frac_range (short: --range, default: 0,0.0001,1)
    The range of enrichment levels to be examined.
    e.g. 0.1,0.5    (beg,end; incre is automatically determined)
    e.g. 0,0.001,1  (beg,incre,end)
    e.g. 0,0.00001,1 (beg,incre,end)

--min_depl_lev_global=enri_lev (short: --global, default: 0.0000)
    The minimum depletion level that applies to all the nuclides
    associated with the designated Mo materials. Overridden, if given,
    by nuclide-specific minimum depletion levels.
    e.g. 0.0007

--depl_order=option (short: --order, default: ascend)
    The order in which the Mo isotopes other than the to-be-enriched one
    will be depleted.
ascend (short: asc)
    Ascending order of mass number
descend (short: desc)
    Descending order of mass number
random (short: rand, alt: shuffle)
    Random order

--inp=fname (short: -i)
    An input file specifying the nuclide-specific minimum depletion levels
    and the calculation precision. See the sample input file for the syntax.
    e.g. 0p9739.enr

--out_path=path (short: --path, default: the value of -isotope)
    Path for the output files.

--out_fmts=ext ... (short: -o, default: dat,xlsx)
    Output file formats.
all
    All of the following ext's.
dat
    Plain text
tex
    LaTeX tabular environment
csv
    comma-separated value
xlsx
    Microsoft Excel 2007
json
    JavaScript Object Notation
yaml
    YAML

--projectiles=particle ... (short: --projs, default: none)
    Reaction projectiles for associating the product nuclides with DCCs.
    If designated, the relevant reporting files are generated
    in addition to the default output files.

```

```
all      All of the following particles.
g        Photon <= Mo-100(g,n)Mo-99
n        Neutron <= Mo-98(n,g)Mo-99, Mo-100(n,2n)Mo-99
p        Proton <= Mo-100(p,2n)Tc-99m

--verbose (short: --verb)
  Display the calculation process in real time. This will pause
  the shell each time a core calculation routine is called; use it
  only when debugging or checking part of the calculation process.

--nofm
  The front matter will not be displayed at the beginning of program.

--nopause
  The shell will not be paused at the end of program.
  Use it for a batch run.
```

## EXAMPLES

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```
perl enrimo.pl --type=mass_frac --range=0,0.00001,1
perl enrimo.pl --mats=moo3 --global=0.0005 --verb
perl enrimo.pl --mats=momet,moo3 --range=0.0974,0.0001,0.9739 --inp=0p9739.enr
```

## REQUIREMENTS

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```
Perl 5
Text::CSV, Excel::Writer::XLSX, JSON, YAML
```

## SEE ALSO

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[enrimo on GitHub](#)

[enrimo on Zenodo](#)

[enrimo in a paper: \*J. Phys. Commun.\* \*\*3\*\* \(2019\) 055015](#)

## AUTHOR

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