

Package ‘RLumCarlo’

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Type Package

Title Monte-Carlo Methods for Simulating Luminescence Phenomena

Version 0.1.0.17

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Description

A collection of functions to simulate luminescence signals with Monte-Carlo methods in the mineral feldspar based on published models.

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License GPL-3

BugReports <https://github.com/R-Lum/RLumCarlo/issues>

Depends R (>= 3.3.0), utils, magrittr

URL <https://CRAN.R-project.org/package=RLumModel>

LinkingTo Rcpp, RcppProgress, RcppArmadillo

Imports abind, doParallel, foreach, parallel, methods, Rcpp

Suggests R.rsp

Encoding UTF-8

VignetteBuilder R.rsp

RoxygenNote 6.1.1

NeedsCompilation yes

R topics documented:

RLumCarlo-package	2
calc_RLumCarlo	2
plot_RLumCarlo	3
run_MC_CW_IRSL	3
run_MC_ISO	5
run_MC_LM_OSL	6
run_MC_TL	7
run_MC_TL_DELOC	8
run_MC_TL_LOC	9

Index**11**

RLumCarlo-package	<i>Modelling luminescence signals in feldspar</i>
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Description**Details**

Package:	RLumCarlo
Type:	Package
Version:	0.0.2
Date:	2018-08-28
License:	GPL-3

Author(s)

Johannes Friedrich (University of Bayreuth, Germany), Sebastian Kreutzer, IRAMAT-CRP2A, UMR 5060, CNRS-Université Bordeaux Montaigne (France)

calc_RLumCarlo	<i>Plot results from Monte-Carlo simulations with RLumCarlo</i>
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Description

Plot results from Monte-Carlo simulations with RLumCarlo

Usage

```
calc_RLumCarlo(results)
```

Arguments

results [array](#):

Value

This function returns a [data.frame](#)

Function version

0.0.1 [2017-01-27]

Author(s)

Johannes Friedrich, University of Bayreuth (Germany)

plot_RLumCarlo

*Plot results from Monte-Carlo simulations with RLumCarlo***Description**

Plot results from Monte-Carlo simulations with RLumCarlo

Usage

```
plot_RLumCarlo(results, times = NULL, norm = FALSE, legend = FALSE,
  add = FALSE, ...)
```

Arguments

results	data.frame (required)
times	numeric (<i>optinal</i>): Optional vector for the x-axis
norm	logical (<i>with default</i>): Normalise curve to the highest intensity
legend	logical (<i>with default</i>): Enable/disable legend
add	logical (<i>with default</i>): allow overplotting of results
...	further arguments that can be passed to control the plot output. Currently supported are: xlab, xlim, ylim, main, lwd, type

Value

This function returns a graphical output

Function version

0.1.0

Author(s)

Johannes Friedrich, University of Bayreuth (Germany), Sebastian Kreutzer, IRAMAT-CRP2A, Université Bordeaux Montaigne (France)

run_MC_CW_IRSL

*Run Monte-Carlo simulation for CW-IRSL***Description**

Run Monte-Carlo simulation for CW-IRSL

Usage

```
run_MC_CW_IRSL(A, rho, times, clusters = 10, r = NULL, N_e = 200,
  method = "seq", output = "signal", ...)
```

Arguments

A	numeric
rho	numeric
times	vector (with default)
clusters	numeric (with default):
r	numeric (with default)
N_e	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Value

This function returns a list.

Function version

0.0.2 [2017-01-31]

Author(s)

Johannes Friedrich, University of Bayreuth (Germany), Sebastian Kreutzer, IRAMAT-CRP2A, Université Bordeaux Montaigne (France)

References

Pagonis 2017

Examples

```
## Not run:

##=====##
## Example 1: Simulate CW-IRSL measurement
##=====##

run_MC_CW_IRSL(A = 0.12, rho = 0.003, times = 0:1000) %>%
  calc_RLumCarlo() %>%
  plot_RLumCarlo(norm = T, legend = T)

## End(Not run)
```

run_MC_ISO

*Run Monte-Carlo simulation for isothermal measurements***Description**

Run Monte-Carlo simulation for isothermal measurements

Usage

```
run_MC_ISO(A, rho, times, clusters = 10, r = NULL, N_e = 200,
  method = "par", output = "signal", ...)
```

Arguments

A	numeric
rho	numeric
times	vector (with default)
clusters	numeric (with default):
r	numeric (with default)
N_e	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Value

This function returns a list.

Function version

0.0.1 [2017-01-27]

Author(s)

Johannes Friedrich, University of Bayreuth (Germany)

References

Pagonis 2017

Examples

```
## Not run:
##=====##
## Example 1: Simulate isothermal measurement
##=====##

times <- seq(0, 500)
run_MC_ISO(A = 0.20,
  rho = 0.007,
```

```

        times = times) %>%
    calc_RLumCarlo() %>%
    plot_RLumCarlo(legend = T)

## End(Not run)

```

run_MC_LM_OSL

Run Monte-Carlo simulation for LM-OSL

Description

Run Monte-Carlo simulation for LM-OSL

Usage

```
run_MC_LM_OSL(A, rho, times, clusters = 10, r = NULL, delta.r = 0.1,
  N_e = 200, method = "par", output = "signal", ...)
```

Arguments

A	numeric
rho	numeric
times	vector (with default)
clusters	numeric (with default):
r	numeric (with default):
delta.r	numeric (with default):
N_e	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Value

This function returns a list.

Function version

0.0.1 [2017-01-27]

Author(s)

Johannes Friedrich, University of Bayreuth (Germany)

References

Pagonis 2017

Examples

```
## Not run:

##TODO: Primary example, should be verified
run_MC_LM_OSL(A = 10000, rho = 0.0001, times = 1:100, clusters = 10, r = NULL,
  delta.r = 0.1,
  N_e = 200, method = "par", output = "signal") %>%
  calc_RLumCarlo() %>%
  plot_RLumCarlo(norm = T)

## End(Not run)
```

run_MC_TL

Run Monte-Carlo simulation for TL

Description

Run Monte-Carlo simulation for TL

Usage

```
run_MC_TL(s, E, rho, r_c, times, clusters = 10, N_e = 200,
  delta.r = 0.1, method = "par", output = "signal", ...)
```

Arguments

s	list
E	numeric
rho	numeric
r_c	numeric (with default)
times	vector (with default)
clusters	numeric (with default):
N_e	numeric (with default):
delta.r	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Value

This function returns an [array](#) with dimension length(times) x length(r) x clusters

Function version

0.0.1 [2017-01-27]

Author(s)

Johannes Friedrich, University of Bayreuth (Germany)

References

Pagonis 2017

Examples

```
## Not run:
##=====##
## Example 1: Simulate TL measurement
##=====##

times <- seq(200, 500) # time = temperature

run_MC_TL(s = 3.5e12,
          E = 1.45,
          rho = 0.015,
          r_c = 0.85,
          times = times) %>%
  calc_RLumCarlo() %>%
  plot_RLumCarlo(legend = T)

## End(Not run)
```

run_MC_TL_DELOC

Run Monte-Carlo simulation for TL for GOT model

Description

##TODO

Usage

```
run_MC_TL_DELOC(s, E, times, clusters = 10, N_e = 200,
  n_filled = N_e, R, method = "par", output = "signal", ...)
```

Arguments

s	numeric (<i>required</i>)
E	numeric (<i>required</i>)
times	numeric (with default)
clusters	numeric (with default):
N_e	integer (with default)
n_filled	integer (with default)
R	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Details

$$I_{DELOC}(t) = -dn/dt = p(t) * (n^2 / (NR + n(1 - R)))$$

Value

This function returns an [array](#) with dimension length(times) x length(r) x clusters

Function version

0.0.1

Author(s)

Sebastian Kreutzer, IRAMAT-CRP2A, UMR 5060, CNRS - Université Bordeaux Montaigne (France)

References

##TODO

Examples

```
##=====##
## Example 1: Simulate TL
##=====##
## Not run:
run_MC_TL_DELOC(
  s = 3.5e12,
  E = 1.45,
  R = 1,
  times = 100:450) %>%
  calc_RLumCarlo() %>%
  plot_RLumCarlo(legend = T)

## End(Not run)
```

run_MC_TL_LOC

Run Monte-Carlo simulation for TL for localised transition

Description

##TODO

Usage

```
run_MC_TL_LOC(s, E, times, clusters = 10, n_filled = 100, r,
  method = "par", output = "signal", ...)
```

Arguments

s	numeric (required)
E	numeric (required)
times	numeric (with default)
clusters	numeric (with default):
n_filled	integer (with default)
r	numeric (with default):
method	character (with default):
output	character (with default):
...	further arguments

Details

$$I_{LOC}(t) = -dn/dt = p(t) * (n^2/(r + n))$$

Value

This function returns an [array](#) with dimension length(times) x length(r) x clusters

Function version

0.0.1

Author(s)

Sebastian Kreutzer, IRAMAT-CRP2A, UMR 5060, CNRS - Université Bordeaux Montaigne (France)

References

##TODO

Examples

```
##=====##
## Example 1: Simulate TL
##=====##
## Not run:
run_MC_TL_LOC(
  s = 3.5e12,
  E = 1.45,
  r = 1,
  times = 100:450) %>%
  calc_RLumCarlo() %>%
  plot_RLumCarlo(legend = T)

## End(Not run)
```

Index

array, [2](#), [7](#), [9](#), [10](#)

calc_RLumCarlo, [2](#)

character, [4–8](#), [10](#)

data.frame, [2](#), [3](#)

integer, [8](#), [10](#)

list, [7](#)

logical, [3](#)

numeric, [3–8](#), [10](#)

plot_RLumCarlo, [3](#)

RLumCarlo-package, [2](#)

run_MC_CW_IRSL, [3](#)

run_MC_ISO, [5](#)

run_MC_LM_OSL, [6](#)

run_MC_TL, [7](#)

run_MC_TL_DELOC, [8](#)

run_MC_TL_LOC, [9](#)

vector, [4–7](#)