

# Package ‘xlum’

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**Type** Package

**Title** Read, Write, and Convert XLUM Data

**Version** 0.1.0

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**Description** Support for the XLUM file format for exchange and long-term preservation of luminescence data. Facilitated are the import and export of XLUM files and the conversion from other formats commonly used to store luminescence (dating) data.

**License** GPL-3

**Depends** R (>= 4.1),  
utils

**Imports** methods,  
base64enc (>= 0.1),  
Luminescence (>= 0.9.19),  
xml2 (>= 1.3.3)

**Suggests** spelling (>= 2.2),  
testthat (>= 3.1.3)

**Encoding** UTF-8

**Language** en-GB

**LazyData** true

**RoxygenNote** 7.3.2

**Collate** 'convert\_Daybreak2xlum.R'  
'convert\_binx2xlum.R'  
'convert\_psl2xlum.R'  
'convert\_rlum2xlum.R'  
'convert\_xsyg2xlum.R'  
'methods.R'  
'read\_xlum.R'  
'utils.R'  
'validate\_xlum.R'  
'write\_xlum.R'  
'xlum-package.R'

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xlum-package	<i>Read, Write, and Convert xlum Data</i>
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## Description

Support for the XLUM-file format for exchange and long-term preservation of luminescence data. Facilitated are the import and export of XLUM-files and the conversion from other ASCII and binary formats commonly used to store luminescence (dating) data.

## Details

### Support contact

- <https://github.com/R-Lum/xlum/discussions>

### Bug reporting

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

### Project source code repository

- <https://github.com/R-Lum/xlum>

### Package maintainer

Sebastian Kreutzer, Institute of Geography, Heidelberg University (Germany),  
<sebastian.kreutzer@uni-heidelberg.de>

### Funding

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## Author(s)

**Maintainer:** Sebastian Kreutzer <sebastian.kreutzer@uni-heidelberg.de> ([ORCID](#))

Other contributors:

- Christoph Burow ([ORCID](#)) [contributor]

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convert_binx2xlum	<i>Convert Risø BIN/BINX to XLUM</i>
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## Description

Wrapped function to quickly convert BIN/BINX files to xlum (files)

## Usage

```
convert_binx2xlum(file, out_file = NULL, ...)
```

```
convert_bin2xlum(file, out_file = NULL)
```

## Arguments

file	<b>character (required)</b> : file
out_file	<b>character (optional)</b> : output file, if set a file output is created
...	support for a limited number of additional arguments to be forwarded to <a href="#">Luminescence::read_BIN2R</a> : position, n.records

## Value

Depending on the setting. If out\_file == NULL an [xml2::xml\\_document](#) object is returned, if file is set the function attempts to write an \*.xlum file`.

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. convert\_binx2xlum(): Convert Risø BIN/BINX to XLUM. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[convert\\_rlum2xlum](#), [Luminescence::read\\_BIN2R](#)

## Examples

```
## Not run:
file <- system.file("extdata/BINfile_V8.binx", package = "Luminescence")
convert_binx2xlum(file)

## End(Not run)
```

---

convert\_Daybreak2xlum *Convert Daybreak TXT and DAT files to XLUM*

---

## Description

Wrapped function to quickly convert Daybreak files to xlum (files)

## Usage

```
convert_Daybreak2xlum(file, out_file = NULL)
```

## Arguments

file                    **character (required)**: file  
out\_file                **character (optional)**: output file, if set a file output is created

## Value

Depending on the setting. If out\_file == NULL an [xml2::xml\\_document](#) object is returned, if file is set the function attempts to write an \*.xlum file`.

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. convert\_Daybreak2xlum(): Convert Daybreak TXT and DAT files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[convert\\_rlum2xlum](#), [Luminescence::read\\_Daybreak2R](#)

## Examples

```
## load package example data  
## for loading own data use  
## file <- file.choose()  
file <- system.file("extdata/Daybreak_TestFile.txt", package = "Luminescence")  
convert_Daybreak2xlum(file)
```

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convert_psl2xlum	<i>Convert SUERC PSL-files to XLUM</i>
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---

## Description

Wrapped function to quickly convert PSL files to xlum (files) from the portable luminescence system produced by the SUERC

## Usage

```
convert_psl2xlum(file, out_file = NULL)
```

## Arguments

file	<b>character (required):</b> file
out_file	<b>character (optional):</b> output file, if set a file output is created

## Value

Depending on the setting. If out\_file == NULL an [xml2::xml\\_document](#) object is returned, if file is set the function attempts to write an \*.xlum file'.

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. convert\_psl2xlum(): Convert SUERC PSL-files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[convert\\_rlum2xlum](#), [Luminescence::read\\_PSL2R](#)

## Examples

```
## load package example data
## for loading own data use
## file <- file.choose()
file <- system.file("extdata", "DorNie_0016.psl", package = "Luminescence")
convert_psl2xlum(file)
```

---

convert_rlum2xlum	<i>Convert RLum-class objects to the XLUM format</i>
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---

## Description

Converts [Luminescence::RLum](#) objects to xlum format

## Usage

```
convert_rlum2xlum(rlum, file = NULL)
```

## Arguments

rlum	<a href="#">Luminescence::RLum.Data</a> and <a href="#">Luminescence::RLum.Analysis</a> or a <a href="#">list</a> of it ( <b>required</b> ): input for the conversion
file	<a href="#">character</a> ( <i>optional</i> ): file name for the export, if NULL (the default), an <a href="#">xml2::xml_document</a> object is returned

## Details

The function tries to make a best possible conversion of the [Luminescence::RLum](#) to the xlum format. [Luminescence::RLum.Results](#) objects are not supported.

Because of the nature the [Luminescence::RLum](#) structure, the nodes `<xlum/>`, `<sample/>` are set automatically because the [Luminescence::RLum](#) does not distinguish between different samples.

## Value

Depending on the setting. If `file == NULL` an [xml2::xml\\_document](#) object is returned, if file is set the function attempts to write an `*.xlum` file'.

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. `convert_rlum2xlum()`: Convert RLum-class objects to the XLUM format. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[Luminescence::RLum.Data](#), [write\\_xlum](#)

## Examples

```
data(ExampleData.RLum.Analysis,  
  envir = environment(),  
  package = "Luminescence")  
convert_rlum2xlum(IRSAR.RF.Data)
```

---

convert_xsyg2xlum	<i>Convert Freiberg Instruments XSYG files to XLUM</i>
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---

## Description

Wrapped function to quickly convert Freiberg Instruments XSYG-files to xlum (files)

## Usage

```
convert_xsyg2xlum(file, out_file = NULL)
```

## Arguments

file	<b>character (required):</b> file
out_file	<b>character (optional):</b> output file, if set a file output is created

## Value

Depending on the setting. If out\_file == NULL an [xml2::xml\\_document](#) object is returned, if file is set the function attempts to write an \*.xlum file'.

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. convert\_xsyg2xlum(): Convert Freiberg Instruments XSYG files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[convert\\_rlum2xlum](#), [Luminescence::read\\_XSYG2R](#)

## Examples

```
## load package example data  
## for loading own data use  
## file <- file.choose()  
file <- system.file("extdata/XSYG_file.xsyg", package = "Luminescence")  
convert_xsyg2xlum(file)
```

---

`read_xlum`*Import XLUM files*

---

### Description

Imports XLUM-files using `xml2::read_xml`. Comes with a few convenience features, such as the transformation of string lists to numeric vectors where meaningful.

### Usage

```
read_xlum(file, verify = TRUE, output = "xlum_list")
```

### Arguments

<code>file</code>	<b>character (required)</b> : path to file
<code>verify</code>	<b>logical (with default)</b> : enable/disable format validation
<code>output</code>	<b>character (with default)</b> : output object of the import, supported are "xml_document", "list", "xlum_list" (the default)

### Details

#### Supported output options

"xlum\_list" (default): imports XML-data and coerces them to list. Numeric values for level <curve> are transposed into **numeric** vectors for better handling

"list": imports XML-data and coerces it to a **list**, no further treatment of data

"xml\_document": unprocessed output from `xml2::read_xml`

### Value

The output depends on the setting selected in output. It will be either an `xml2::xml_document`, **list**, or a **list** of class `xlum_list`.

### Function version

0.1.0

### How to cite

Kreutzer, S., 2024. `read_xlum()`: Import XLUM files. Function version 0.1.0. In: Kreutzer, S., 2024. `xlum`: Read, Write, and Convert XLUM Data. R package version 0.1.0.

### Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

### See Also

`xml2::read_xml`, `validate_xlum`, `write_xlum`



## Examples

```
file <- system.file("extdata/xlum_example.xlum", package="xlum")
read_xlum(file)
```

---

validate\_xlum

*Validate xlum format against an XSD reference schema*

---

## Description

A a convenience wrapper around [xml2::xml\\_validate](#) against the reference format description shipped with [xlum-package](#)

## Usage

```
validate_xlum(file, xsd_version = NULL)
```

## Arguments

**file** [xml2::xml\\_document](#) (**required**): object to test

**xsd\_version** [numeric](#) (*optional*): specify format version for the validation, e.g., 1, 1.1. The default is NULL, which will use the most recent version

## Value

Results of the validation [logical](#) with attributes

## How to cite

Kreutzer, S., 2024. validate\_xlum(): Validate xlum format against an XSD reference schema. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University

## Examples

```
file <- system.file("extdata/xlum_prototype.xlum", package = "xlum")
validate_xlum(file)
```

---

write_xlum	<i>Write XLUM-files</i>
------------	-------------------------

---

## Description

Create XLUM-files using [xml2::read\\_xml](#)

## Usage

```
write_xlum(x, file, encode_base64 = FALSE, ...)
```

## Arguments

x	xlum_list, <a href="#">list</a> , <a href="#">xml2::xml_document</a> ( <b>required</b> ) : input object
file	<a href="#">character</a> ( <b>required</b> ): valid file path and file name with ending .xlum (will be add automatically if needed)
encode_base64	<a href="#">logical</a> ( <i>with default</i> ): enable/disable base64 encoding for values in the <curve/> node. Please note that this parameter works only if the input is of class xlum_list
...	further arguments to be passed to <a href="#">xml2::write_xml</a>

## Value

Creates an XML-file with ending \*.xlum

## Function version

0.1.0

## How to cite

Kreutzer, S., 2024. write\_xlum(): Write XLUM-files. Function version 0.1.0. In: Kreutzer, S., 2024. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0.

## Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

## See Also

[xml2::write\\_xml](#), [read\\_xlum](#)

## Examples

```
file <- system.file("extdata/xlum_prototype.xlum", package="xlum")
out_file <- tempfile()

xlum_data <- read_xlum(file)
write_xlum(xlum_data, out_file)
```

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