

LaTeX: Scientific Document Writing

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LaTeX: An Introduction

Useful for writing:

1. Article/Review/Communication
2. Scientific Report/Projects
3. Thesis/Dissertation/Synopsis
4. Slide Presentation (Beamer)/Poster
5. CV/Bio-data/Letter

Advantages:

- Ease in managing text + images + equations + tables + Chemical formula/reaction
- Ease to manage reference link within the document
- Ease to manage references and their style (in **Bibtex** form)
- Quick Indexing and auto section/subsection/subsubsection numbering
- Full control over spacing, text sizes and color mixing
- Small file size (easy to transfer or store)

Download and Access

Free download and accessible:

Link for download:

For Windows:

MiKTeX 2.9 or above

<https://miktex.org/download>

LaTeX Editor - Texmaker 4.0 or above

<http://www.xmlmath.net/texmaker/download.html>

Download as per OS

-32/64 bit

-Windows 7/10

File extensions in LaTeX & Compilation

Latex Document	:	INSPIRE.tex
Latex Reference File	:	Reference.bib
Latex Output File	:	INSPIRE.pdf

LaTeX Commands:

- PdfLaTeX + View PDF
- Latex + dvips + ps2pdf + View PDF
- PdfLaTeX + Bib(la)tex + PdfLatex (x2) + View PDF
- Latex + + Bib(la)tex + PdfLatex (x2) + dvips + ps2pdf + View PDF

Document preparation

```
\documentclass[11pt,a4paper,twoside]{article}
\usepackage[utf8]{inputenc}
\usepackage{amsmath}
\usepackage{graphicx}
\begin{document}
•
\end{document}
```

Various commands and Environments:

`\section{RESULTS}`

`\subsection{NMR DATA}`

`\subsubsection{Proton NMR}`

`\subsubsection{Carbon NMR}`

`\begin{itemize}`

`\item` How to make a itemized list

`\item` Look at this command

`\end{itemize}`

This is numbered list:

`\begin{enumerate}`

`\item` How to make a numbered list

`\item` Look at this command

`\end{enumerate}`

1 RESULTS

1.1 NMR DATA

1.1.1 Proton NMR

1.1.2 Carbon NMR

This is itemized list:

- How to make a itemized list
- Look at this command

This is numbered list:

1. How to make a numbered list
2. Look at this command

Insertion of Graphic/s

```

\begin{figure}
\centering
\includegraphics[scale=0.5]{Path/FileName.png}
\caption{This is caption for the figure.}
\label{Nick-Name}
\end{figure}

```

Figure Alignments:

```
\begin{figure}[htb!]
```

•

```
\end{figure}
```

H-horizontal
T-top
B-bottom
!-auto-alignment

Figure Sizes:

```
[scale=0.9]      [height=12cm]      [width=18cm]
```

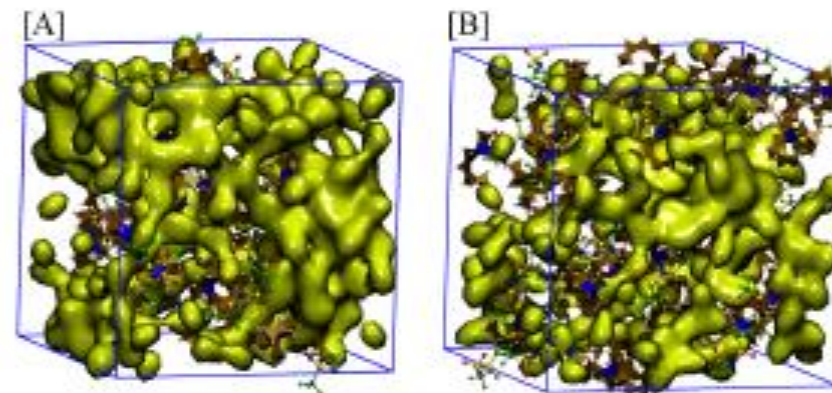


Figure 1: This is caption for the figure.

Insertion of Table

```
\begin{table}
```

```
\centering
```

```
\caption{This is tabular format}
```

```
\begin{tabular}{|l|c|c|c|}
```

```
\hline
```

```
Title & Name & Particular & Marks\\
```

```
\hline
```

```
1 & AAA & - & 00\\
```

```
2 & BBB & - & 20\\
```

```
3 & CCC & - & 40\\
```

```
\hline
```

```
\end{tabular}
```

```
\end{table}
```

Table 1: This is tabular format

Title	Name	Particular	Marks
1	AAA	-	00
2	BBB	-	20
3	CCC	-	40

Tables in LaTeX

```

\begin{center}
\begin{tabular}{| p{3.15cm} | c | c | c | c |}
\hline
$10^3\text{\ce{[A]0}/mol dm}^{-3}$ & 8.13 & 6.44 & 3.10 & 1.88 \\
\hline
$t_{0.69}/s$ & 590 & 665 & 900 & 1140 \\
\hline
\end{tabular}
\end{center}

```

$10^3[A]_0/\text{mol dm}^{-3}$	8.13	6.44	3.10	1.88
$t_{0.69}/s$	590	665	900	1140

Packages for Table

```

\usepackage{xcolor,colortbl}
\usepackage{multirow}
\usepackage{tabularx}

```

Spacing and Alignment

```

\renewcommand{\baselinestretch}{1.25}
\newcolumntype{B}[1]{>\centering\arraybackslash}p{#1}
\newcolumntype{R}[1]{>\raggedleft\arraybackslash}p{#1}

```

Examples:

```

\begin{center}
\begin{table}
\renewcommand{\thetable}{A7-1}
\setcounter{table}{0}
\caption{Define Table Caption.}
\label{Table_A7_1}
\begin{tabular}{| p{2.5cm} | B{3.5cm} | B{3.85cm} | R{3.5cm} |}
\hline
\rowcolor{gray!20}&\multicolumn{3}{c|}{The Experiment}\\
\hline
Test & Name & Cell Type & $q$\\
\hline
\hline
\multirow{3}{4em}{Multiple row} & E.Coli & cell-3 & 1.9\\
& E.Coli & cell-2 & 1.3\\
& E.Coli & cell-3 & 1.3\\
\hline
\end{tabular}
\end{table}
\end{center}

```

Table A7-1: Define Table Caption.

The Experiment			
Test	Name	Cell Type	<i>q</i>
Multiple row	E.Coli	cell-3	1.9
	E.Coli	cell-2	1.3
	E.Coli	cell-3	1.3

Chemical Formula and Chemical Reactions

```
\usepackage{mhchem}
```

To write chemical formula in text:

```
\ce{[Rh(CO)2I2]-}, \ce{[RhCl(PPh3)3]}
```

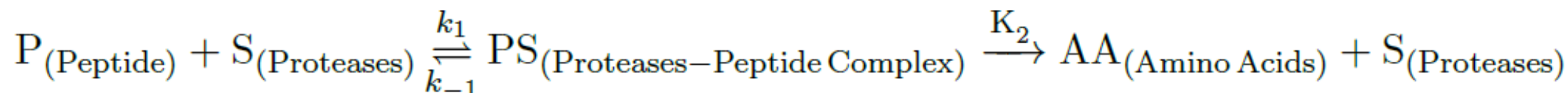
$[\text{Rh}(\text{CO})_2\text{I}_2]^-$, $[\text{RhCl}(\text{PPh}_3)_3]$

Chemical Reactions:

```
\begin{center}
```

```
\ce{P$ _{(Peptide)}}$ + S$ _{(Proteases)}}$, $\underset{k_{-1}}{\stackrel{k_1}{\rightleftharpoons}}$, PS$ _{(Proteases-Peptide-Complex)}}$ ->[\ce{K_2}] AA$ _{(Amino-Acids)}}$ + S$ _{(Proteases)}}$
```

```
\end{center}
```



Equations or Equation array

This is how Angstrom is written - `\AA`

This is how Angstrom is written - Å
 Math mode in between text: $\Omega \text{ cm}^{-1}$
 Equation array without numbering:

Math mode in between text: $\Omega \text{ cm}^{-1}$

$$V = IR$$

$$v_{(x,y)} = \frac{\partial x}{\partial t} \cdot \frac{\partial y}{\partial t}$$

Equation array without numbering:

`\begin{eqnarray*}`

`V=IR \\\`

`v_{(x,y)}=\frac{\partial x}{\partial t}\cdot\frac{\partial y}{\partial t}`

`\end{eqnarray*}`

Equation with numbering:

$$I = I_0 \sin wt \quad (1)$$

Equation with numbering:

`\begin{equation}`

`I=I_{_0}\sin {wt}`

`\end{equation}`

References in LaTeX

Single citation

```
\cite{reference_name}
```

Multiple citation

```
\cite{reference_name1,reference_name2,reference_name3}
```

```
\bibliographystyle{achemso}
```

```
\bibliography{Reference_File_Name}
```

↑
Reference.bib

```
@Article{Chen2013,
  Title      = {Dynamic Heterogeneity and Ionic Conduction},
  Author     = {Chen, Fangfang and de Leeuw, Simon W. and Forsyth, Maria},
  Journal    = {J. Phys. Chem. Lett.},
  Year      = {2013},
  Number    = {23},
  Pages     = {4085-4089},
  Volume    = {4},

  Doi       = {10.1021/jz402222j},
  Url      = {http://dx.doi.org/10.1021/jz402222j}
}
```

Do practice and learn more

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ACS:

<http://pubs.acs.org/page/4authors/submission/tex.html>

<https://ctan.org/tex-archive/macros/latex/contrib/achemso>

RSC:

<http://www.rsc.org/journals-books-databases/journal-authors-reviewers/author-tools-services/>

Thesis Templates:

<https://www.sharelatex.com/templates/thesis>

<https://www.latextemplates.com/template/masters-doctoral-thesis>

Template for CV/Cover-letter:

<http://www.latextemplates.com/template/moderncv-cv-and-cover-letter>

Thanking You