The precise mass of a compound is its molecular weight calculated using the masses of the most abundant isotope of constituent elements.

<table>
<thead>
<tr>
<th>element</th>
<th>most abundant isotope</th>
<th>mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>(^1\text{H})</td>
<td>1.0078</td>
</tr>
<tr>
<td>C</td>
<td>(^{12}\text{C})</td>
<td>12.0000</td>
</tr>
<tr>
<td>N</td>
<td>(^{14}\text{N})</td>
<td>14.0031</td>
</tr>
<tr>
<td>O</td>
<td>(^{16}\text{O})</td>
<td>15.9949</td>
</tr>
<tr>
<td>S</td>
<td>(^{32}\text{S})</td>
<td>31.9721</td>
</tr>
<tr>
<td>F</td>
<td>(^{19}\text{F})</td>
<td>18.9984</td>
</tr>
<tr>
<td>Cl</td>
<td>(^{35}\text{Cl})</td>
<td>34.9696</td>
</tr>
<tr>
<td>Br</td>
<td>(^{79}\text{Br})</td>
<td>78.9183</td>
</tr>
<tr>
<td>I</td>
<td>(^{127}\text{I})</td>
<td>126.9045</td>
</tr>
<tr>
<td>P</td>
<td>(^{31}\text{P})</td>
<td>30.9738</td>
</tr>
</tbody>
</table>

**eg. 1:**

```

```

molecular formula = CH₂O

precise mass = (1x12.0000) + (4x1.0078) + (1x15.9949)

= 32.0261

**eg. 2:**

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molecular formula = CH₃Cl

precise mass = (1x12.0000) + (3x1.0078) + (1x34.9689)

= 49.9923

**eg. 3:**
molecular formula = CH₄S
precise mass = (1x12.0000) + (4x1.0078) + (1x31.9721)
= 48.0033

eg. 4:

\[
\begin{array}{c}
    H \\
    \text{N} \\
    \text{O} \\
    \text{O}^{-} \\
    H \\
\end{array}
\]

molecular formula = CH₂NO₂
precise mass = (1x12.0000) + (3x1.0078) + (1x14.031) + (2x15.9949)
= 61.0163

see also nominal mass, high-resolution mass spectrum

Contributors

- Gamini Gunawardena from the OChemPal site (Utah Valley University)