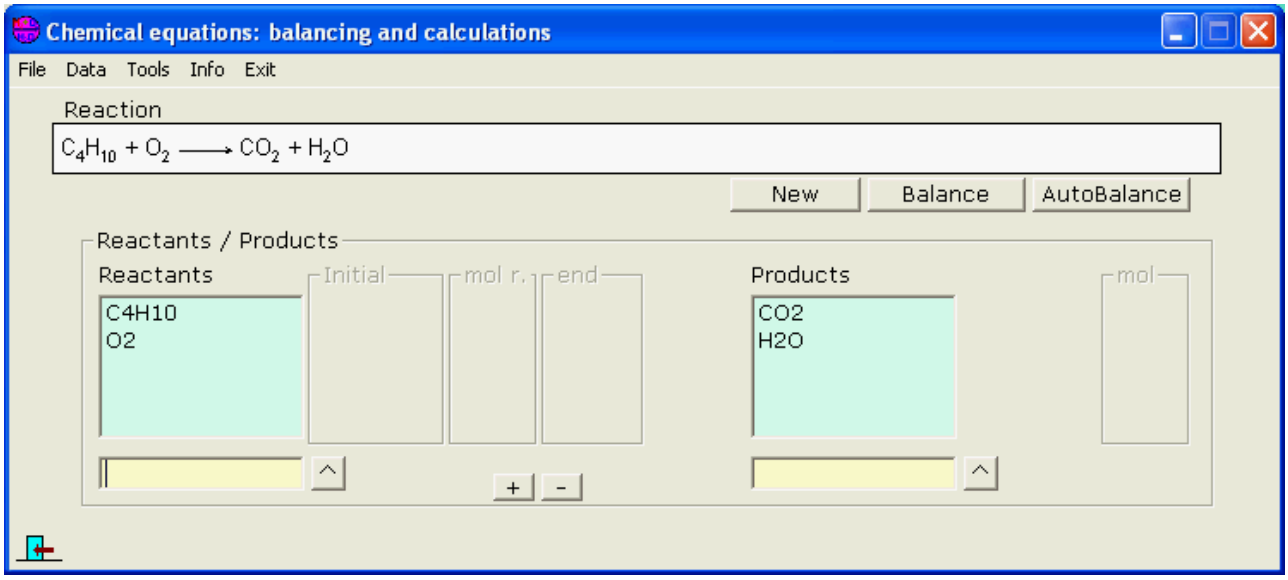
REACK

Balancing and calculations on chemical equations



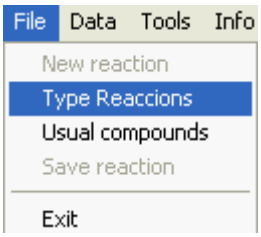
- Reactions: importing and editing
- Balancing a reaction
- Calculations on a chemical equation
- Problem

Reactions: importing and editing

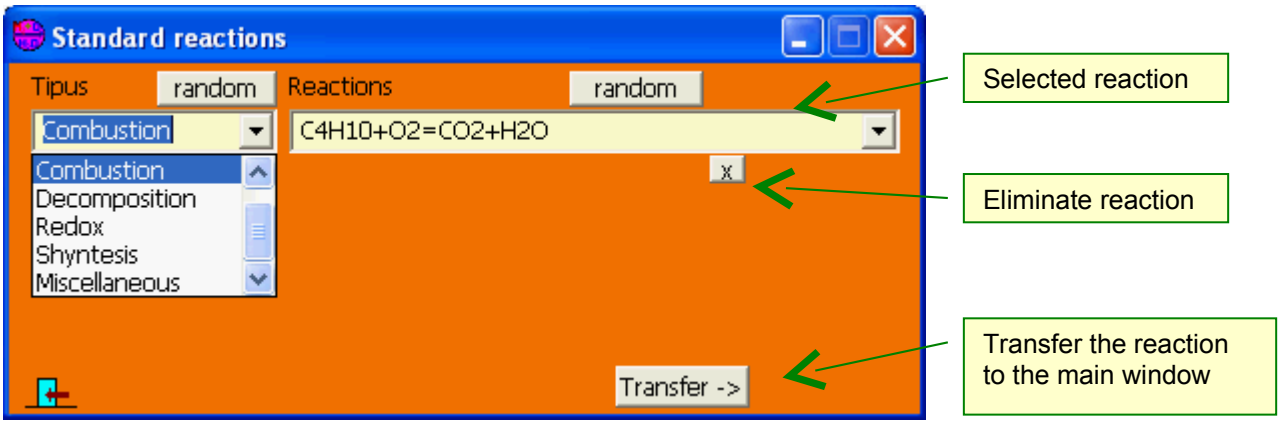
Only are supported “molecular” (not ionic) reactions, and they only may consist in formulas and coefficients (not other indications)

Importing standard reactions

Clicking on the menu **File** option…



The window that connects with the database of standard reactions is shown

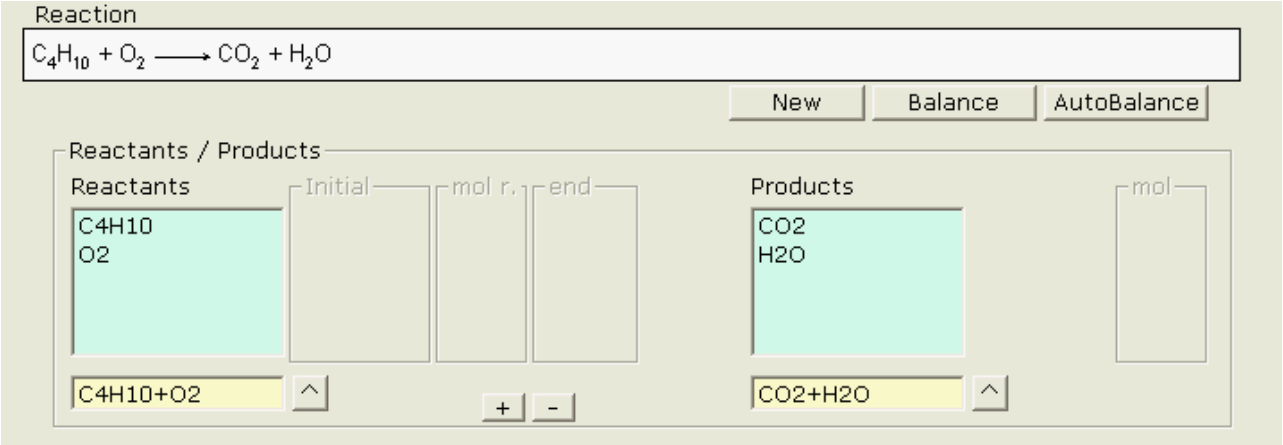


At this window you can also:

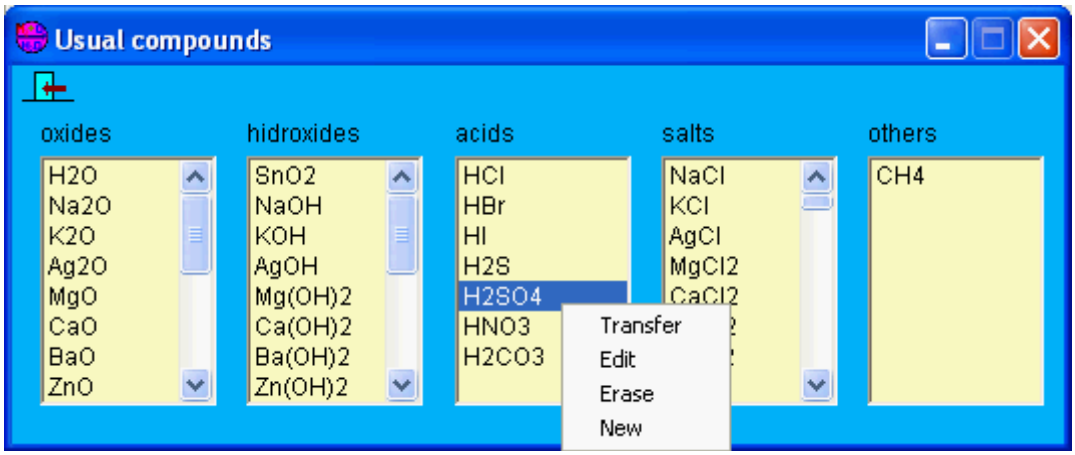
- **Add**: a new group or reaction by introducing it in its textbox (+Return)
- **Modify**: by selecting one from its list, editing it and Return
- **Erase**: by selecting it and clicking on the button x

Building /editing manually a chemical equation

Introducing the reactants and products in their textboxes, the chemical equation (not balanced) will be formed.



An option to introduce formulas without writing them is to invoke the window of compounds…

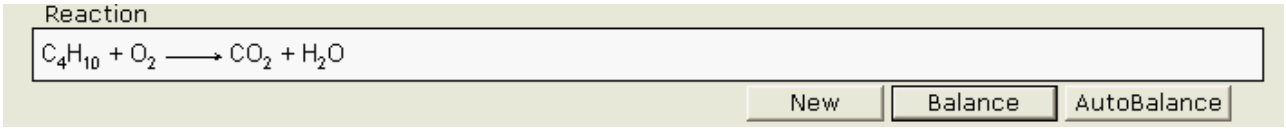


Here you have these options:

- **Transfer** selected formula to the main window
- **Edit** formula (and name)
- **Erase** compound
- **New:** ncorporate new compounds

Balancing a reaction

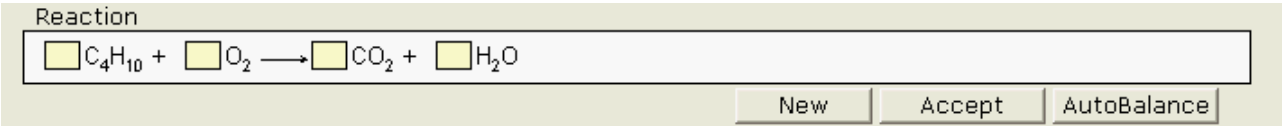
Once obtained a reaction, we must balance its equation so that it reflects the proportion in mols of the implied compounds.



- **Manual balancing**
- **Autobalancing**

Manual balancing: Click on Balance

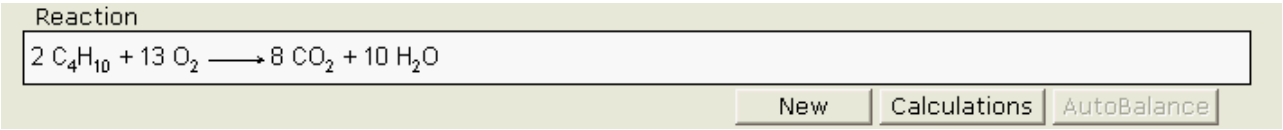
Then, the textboxes to introduce the coefficients of reactants and products are shown.



Clicking on Accept the program will accept the balance if it is correct or it will show error messages if not .

Autobalancing: Clicking on AutoBalance the program will calculate the coefficients.
This option is not advisable from the point of view of learning, but it will be useful when you want to pass directly to the phase of calculations.

Anyway, you obtain the balanced equation:



Note about **autobalancing**: the method is purely mathematical and, although rarely, in the Redox reactions can give a result mathematically correct but chemically false, that is: such that the number of electrons given by the reducer is different from the one captured by the oxidizer. An example:
The reaction $KMnO_4 + H_2S + H_2SO_4 = MnSO_4 + S + K_2SO_4 + H_2O$, if balanced by the mathematic method gives $2\ KMnO_4 + 2\ H_2S + 2\ H_2SO_4 = 2\ MnSO_4 + S + K_2SO_4 + 4\ H_2O$, that is compliant with the mass conservation, but balanced by the ion-electron method yields the chemically actual equation:

$$2\ KMnO_4 + 5\ H_2S + 3\ H_2SO_4 = 2\ MnSO_4 + 5\ S + K_2SO_4 + 8\ H_2O$$

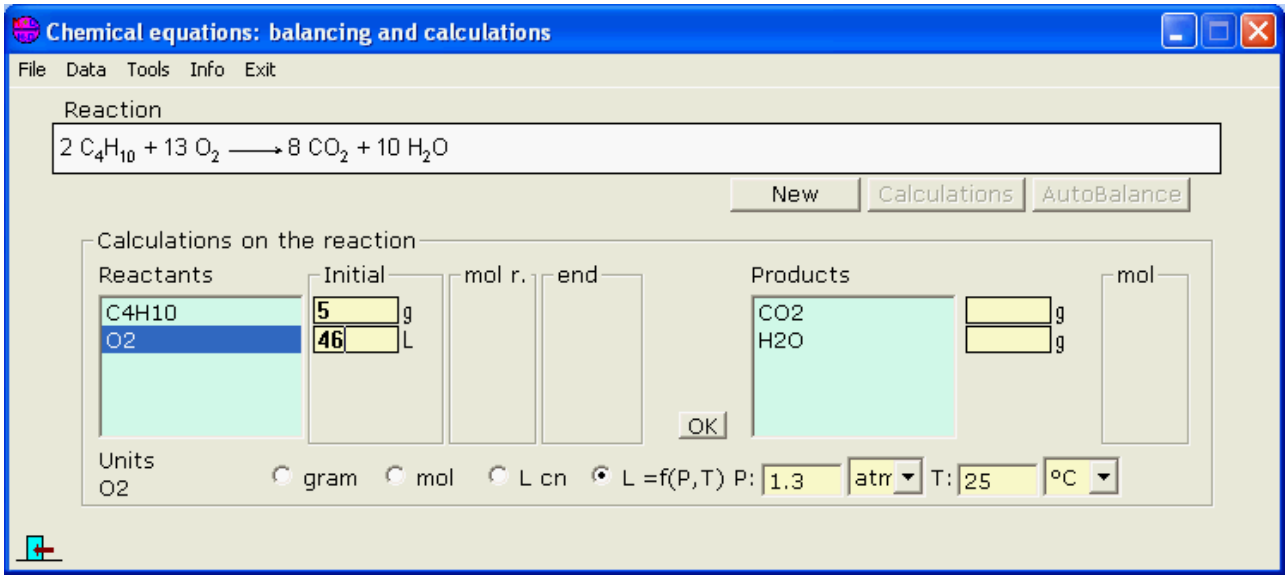
Calculations based on a (balanced) reaction:

Once balanced the equation, clicking on Calculations the textboxes for introduce data and present results will be shown.

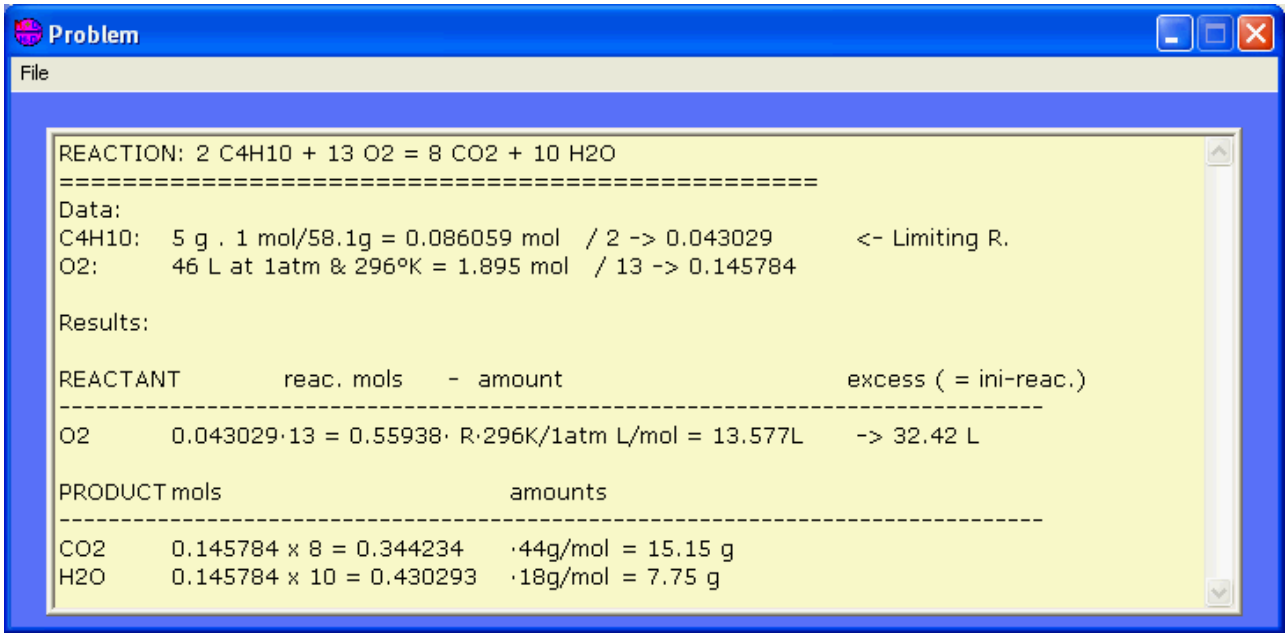
You can introduce data of:

- One or more reactants (if more than one, the limiting reactant will be calculated).
- Or only one product (if more, they will be ignored).

The units of those (grams by default) can also be chosen here.



Cicking OK after the introduction, results are shown in the empty textboxes, and also a window that shows an outline of the "problem" formed:



The problem can be saved in a file (in mode text). If the file already exists the problem will be added to it, and if not it will be created.