24. ELEMENTS MODULE

The basic chemical and physical properties of the elements have a decisive effect on the thermochemical properties of compounds. For example, the electronegativity values of the elements have a strong effect on the chemical bonds between the elements in all chemical compounds. Therefore the periodic system of elements sets the base for thermochemistry.

The Elements module offers an element database in spreadsheet format with some 56 different properties of the elements. The user may easily add his own data to this table in the same way as in MS Excel applications. This data may be saved for later use by the **File Save** selection. The default name of the workbook is Element4.ele.

Diagram enables the user to draw illustrative diagrams on the basis of the selected property row. Density row 7 has been selected in the example of Fig. 1 and the diagram, shown in Fig. 2, may be drawn by pressing **Diagram**.

The diagram shows at a glance the greatest and smallest values in the periodic system. The exact number values behind the spheres may be shown by double clicking the element square or label in the diagram. The diameter of the sphere shows the magnitude of the value compared to the maximum value. The maximum value creates a sphere, which fits exactly to the element box in Fig. 2.

The **Fix Left 2 Columns** selection, Fig. 1, fixes the two left columns. This makes it possible to see the property headings and units for all the elements, when scrolling the element sheet.

The normal copy and paste properties as well as format and printing functions are available as in other HSC modules. The workbook form may be resized by dragging the form boundaries using the mouse or from the icons at the top right corner of the form.

Elements C:\HSC5\DATABASE\Element4.ELE

File Edit Insert Delete Format Help

C7 | 0.0899

	Property	Units	H	He	Li	Be
1	Atomic Number		1	2	3	4
2	Symbol		H	He	Li	Be
3	Name		Hydrogen	Helium	Lithium	Beryllium
4	Atomic Weight	g/mol	1.0079	4.0026	6.9410	9.0122
5	Oxidation States, Most Stable		1	-	1	2
6	Oxidation States		1	-	1	2
7	Density	g/ml	0.0899	0.1787	0.53	1.85
8	Electron Configuration		1s1	1s2	1s22s1	1s22s2
9	Melting Point	K	14.025	0.95	453.7	1560
10	Melting Point Pressure	atm	1	26	1	1
11	Boiling Point	K	20.268	4.215	1615	2745
12	Electronegativity		2.2	-	0.98	1.57
13	Heat of Vaporization	kJ/mol	0.44936	0.0845	145.92	292.4
14	Heat of Fusion	kJ/mol	0.05868	-	3	12.2
15	Electrical Conductivity	E6/(ohm*c	-	-	0.108	0.313
16	Thermal Conductivity	W/(cm*K)	0.001815	0.00152	0.847	2
17	Specific Heat Capacity	J/(g*K)	14.304	5.193	3.6	1.82
18	First Ionization Potential	V	13.598	24.587	5.392	9.322
19	Atomic Volume	ml/mol	14.4	-	13.1	5
20	Atomic Radius	Å	0.79	0.49	2.05	1.4
21	Covalent Radius	Å	0.32	0.93	1.23	0.9
22	Crystal Structure		hexagonal	hexagonal	body centered	hexagonal
23	Acid-Base Properties		amphoteric		basic	amphoteric

☑ Fix Left 2 Columns   Exit   Diagram

Fig. 1. The Elements module contains several basic properties of the elements. The selected property may be illustrated in graphical format by pressing **Diagram**.
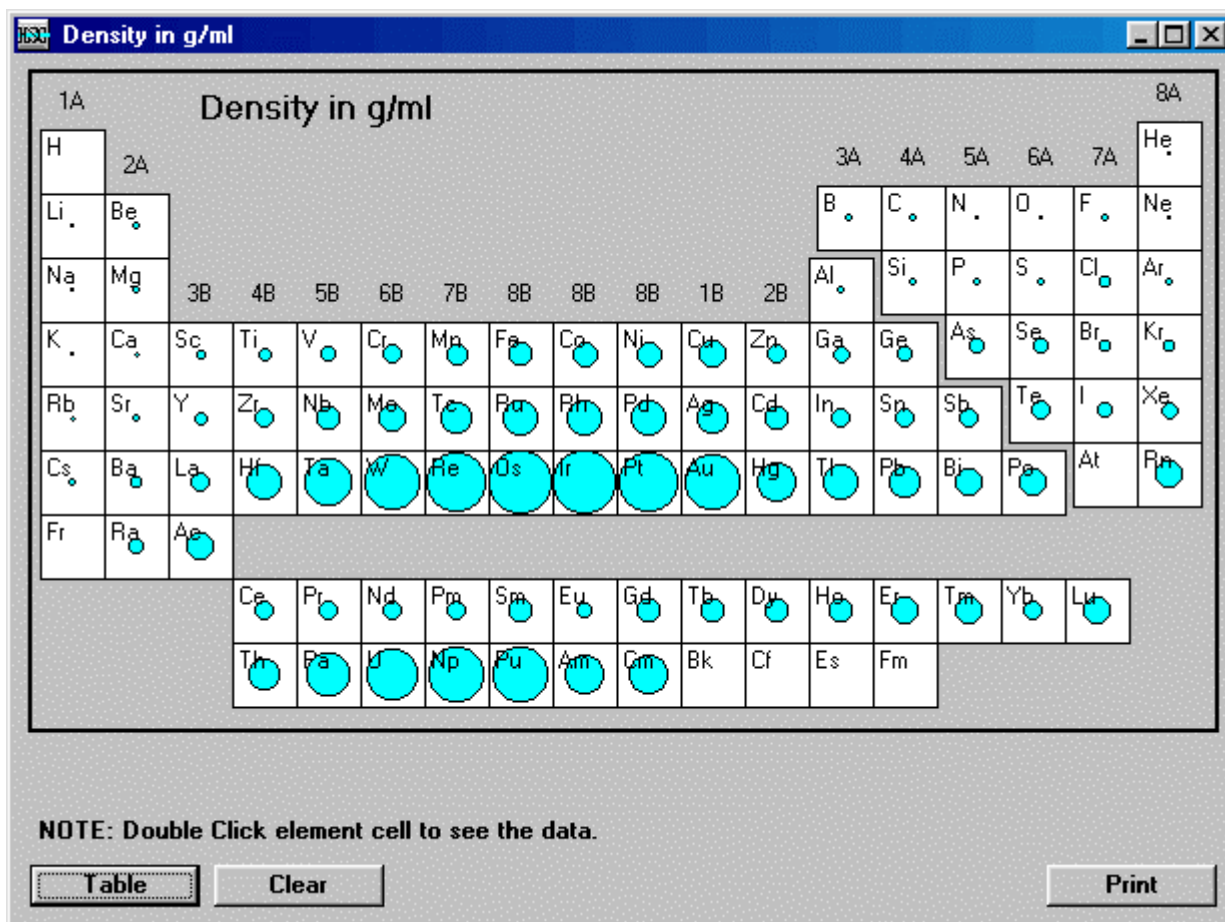
Fig. 2. The properties of the elements may be illustrated in graphical format. The values of the properties may be shown by double clicking the element.