

## PART V. ENSEMBLES

Atoms are bound into molecules by the interactions of the electrons of the atoms. Groups of molecules can bind together through residual interactions of the electrons as well.<sup>1</sup>

In this unit we will see how to identify and solve problems related to the phases of matter under various external conditions. When you finish this unit you should be able to determine the phases of a substance, answer a variety of questions about the phases of gases and structure of solids, convert between various solution concentration units and determine sizes of atoms and molecules in gases and crystals.

The foundation concept for this unit is that *the stability of molecules and groups of molecules is determined by the competition between the strength of the attractions and the dissipative forces of the thermal energy of the system due to molecular collisions.*

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<sup>1</sup> It is necessary in these discussions to use the broad definition of molecules as consisting of single atoms, neutral or ionized, or collections of atoms, possibly ionized (polyatomic ions), but stabilized by chemical bonds.