

CHAPTER OVERVIEW

24: Indistinguishable Molecules - Statistical Thermodynamics of Ideal Gases

The ensemble analysis shows that the thermodynamic functions for an N -molecule system can be developed from the principles of statistical mechanics whether the molecules of the system interact or not. The theory is valid irrespective of the strengths of inter-molecular attractions and repulsions. However, to carry out numerical calculations, it is necessary to know the energy levels for the N -molecule system. For systems in which the molecules interact, obtaining useful approximations to these levels is a difficult problem. As a result, many applications assume that the molecules do not interact with one another. In this chapter we apply the results from the ensemble theory to the particular case of ideal gases.

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