

The Chemical Potential – a Basic Physical Quantity

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The chemical potential, defined as a partial derivative of a quantity which contains both energy and entropy, seems to be complex beyond despair. As indicated by its name, the chemical potential seems to be relevant only to chemists and can be ignored confidently by physicists, physics teachers or engineers.

The introductory statement reflects a common prejudice which tempts scientists to neglect a very versatile and very powerful physical concept without feeling bad about it. Although the chemical potential is mainly used in chemistry, its range of applications in physics is even larger than that in chemistry.

As a matter of fact, only few properties of the chemical potential are necessary for a complete description. These properties are so easy to grasp, that the chemical potential can be taught even in O-level courses. The pupils' knowledge of the concepts of energy and entropy may be helpful in some cases but many phenomena can be explained easier by the chemical potential alone.