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# <<物理化学>>

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作者：礼维恩

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## 前言

随着经济全球化、教育国际化趋势的逐渐增强，迫切需要既精通专业知识又精通外语的高素质人才。

化学是自然科学的“中心学科”，高等化学教育应面向世界，适应时代的需要，吸收国外先进的教学理念和教育教学形式，培养学生适应国际形势需要的综合素质。

为反映国外化学类教材的最新内容和编写风格，同时也为提高学生阅读专业文献和获取信息的能力，为高等学校使用英文原版教材进行双语教学服务，我们精选了国外优秀的化学类教材，组成“国外高校优秀化学教材——影印版”，本书即为其中的一册。

所选教材均在国外广泛采用，多数已再版，书中不仅介绍了有关概念、原理及应用，给出了丰富的实例和数据，还反映了作者不同的学术观点。

我们希望这套丛书的出版能对高等学校师生有所帮助，并对我国高等化学教育的发展做出贡献。

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## 内容概要

《国外高校优秀化学教材（影印版）：物理化学（第6版）》为高等学校物理化学课程教材。《国外高校优秀化学教材（影印版）：物理化学（第6版）》系统介绍了物理化学的基本原理，内容安排以学生学习为导向。
通过清晰解释、逐步推导，提及必要的数学物理知识，并避免较难的数学工具，使学生易于理解。书中含大量例题，各章后安排小结、习题及测试题。

《国外高校优秀化学教材（影印版）：物理化学（第6版）》主要内容包括：热力学，热力学第一定律，热力学第二定律，物质平衡，反应的标准热力学函数，理想气体混合反应平衡，单组分的相平衡和表面，真实气体，溶液，非理想溶液，非理想体系反应平衡，多组分的相平衡，电化学，气体的动力学理论，传递过程，反应动力学，量子力学，原子结构，分子电子结构，光谱和光化学，统计力学，反应速率理论，固体和液体。

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## 作者简介

作者：（美国）礼维恩（Ira N.Levine）

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## 章节摘录

版权页： 插图： The laser system is contained in a cylindrical cavity whose ends have parallel mirrors.A few photons are spontaneously emitted as molecules go from state 2 to state 1.Those emitted at an angle to the cylinder's axis pass out of the system and play no part in the laser action.Those emitted along the laser axis travel back and forth between the end mirrors and stimulate emission of further photons of frequency(E2-E1)/h.The presence of the end mirrors makes the laser a resonant optical cavity in which a standing-wave pattern is produced.If l is the distance between the mirrors,only light of wavelength λ such that nλ/2 is equal to l,where n is an integer,will resonate in the cavity.This makes the laser radiation nearly monochromatic(single-frequency).(Ordinarily,a given transition in a collection of molecules is spread over a range of frequencies,as a result of various effects;see Hollas,sec.2.3.)One of the end mirrors is made partially transmitting to allow some of the laser radiation to leave the cavity. The laser output is highly monochromatic,highly directional,intense,and coherent.Coherent means the phase of the radiation varies smoothly and nonrandomly along the beam.These properties make possible many applications in spectroscopy and kinetics.Thousands of different lasers exist.The material in which the laser action occurs may be a solid,liquid,or gas.The frequency emitted may lie in the infrared,visible,or ultraviolet region.The laser light may be emitted as a brief pulse (recall the use of lasers in flash photolysis-Sec.16.14),or it may be continuously emitted,giving a CW (continuous wave) laser.Most lasers emit light of fixed frequency,but by using a tunable dye laser or tunable semiconductor laser,one can vary the frequency that will resonate in the cavity.Kinds of lasers.A solid-state metal-ion laser contains a transparent crystal or glass to which a small amount of an ionic transition-metal or rare-earth compound has beenadded.For example,the ruby laser contains an Al2O3 crystal with a small amount of Cr2O3;the Cr3+ ions substitute for some of the Al3+ ions in the crystal structure.The Nd:YAG laser contains an yttrium aluminum garnet (YAG) crystal (Y3Al5O12) with impurity Nd3+ ions substituting for some y3+ ions.The laser action involves electronic energy levels of the Cr3+ or Nd3+ ions in the crystal (electric) field of the host crystal.These lasers are usually pumped by a surrounding flashlamp to achieve population inversion.Small Nd:YAG CW lasers are pumped by semiconductor-laser light.

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