Collision Induced Absorption in Gases: A Comprehensive Guide

Collision Induced Absorption (CIA) is a phenomenon that occurs when two molecules collide and absorb a photon of light. This process is important in a variety of fields, including atmospheric physics, combustion chemistry, and plasma physics. CIA can be used to study the properties of molecules and to develop new technologies.

Collision-induced Absorption in Gases (Cambridge Monographs on Atomic, Molecular and Chemical Physics) by Lothar Frommhold

4.6 out of 5

Language	: English
File size	: 79313 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 896 pages
Hardcover	: 265 pages
Item Weight	: 1.28 pounds

The Theory of CIA

CIA occurs when two molecules collide and exchange energy. The energy that is exchanged can be in the form of translational, rotational, or vibrational energy. The type of energy that is exchanged depends on the properties of the molecules involved. For example, if two molecules have similar masses, they will exchange translational energy. If two molecules

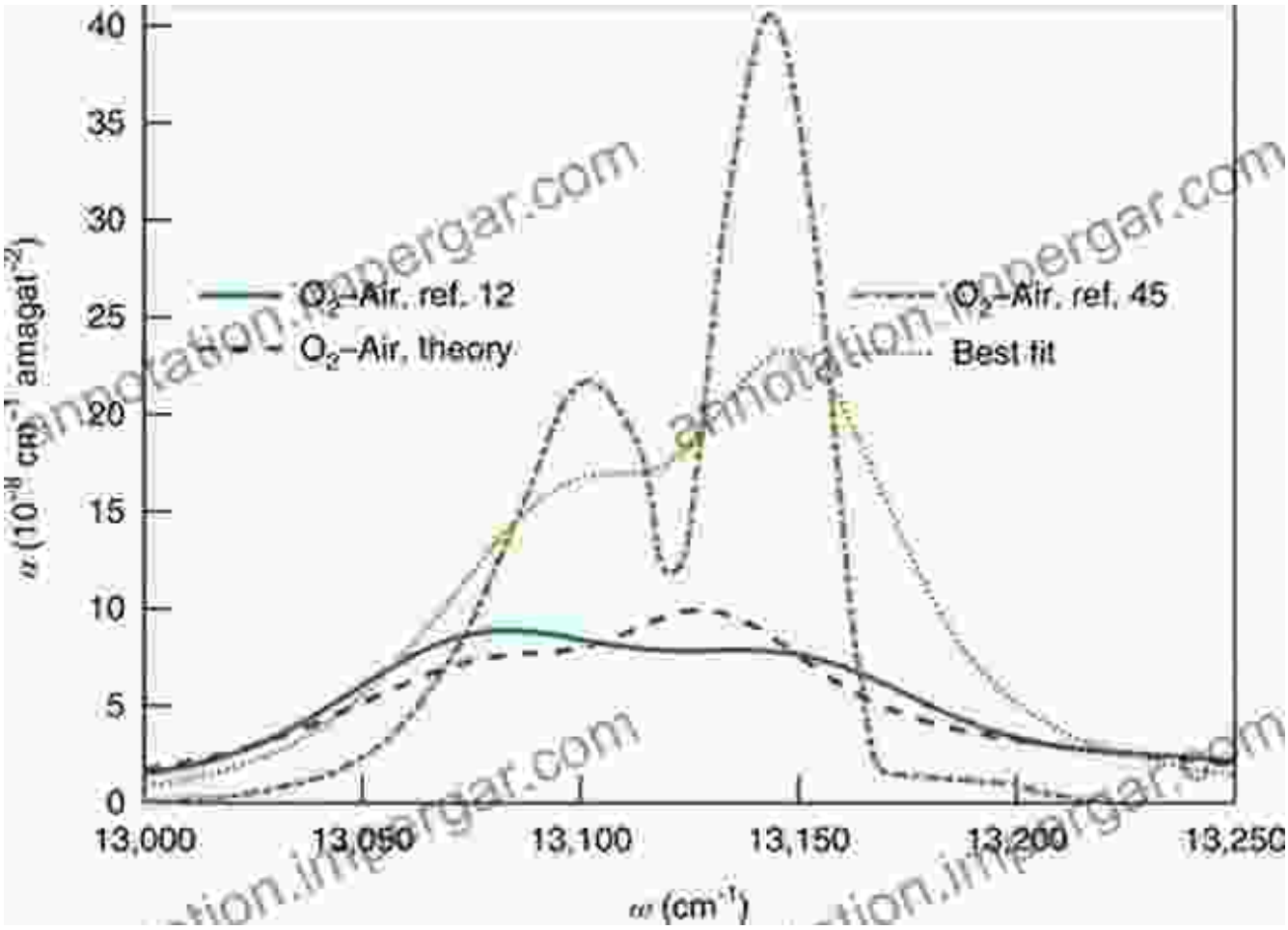
have different masses, they will exchange rotational energy. If two molecules have different vibrational frequencies, they will exchange vibrational energy.

The cross section for CIA is a measure of the probability that a collision will result in the absorption of a photon of light. The cross section depends on a number of factors, including the properties of the molecules involved, the temperature of the gas, and the wavelength of the light. The cross section can be measured using a variety of techniques, including laser absorption spectroscopy and photoacoustic spectroscopy.

Applications of CIA

CIA has a wide range of applications in a variety of fields. In atmospheric physics, CIA is used to study the properties of the atmosphere. CIA can be used to measure the concentration of different gases in the atmosphere, and to study the effects of pollution on the atmosphere. In combustion chemistry, CIA is used to study the reactions that occur during combustion. CIA can be used to measure the rates of reaction, and to identify the products of reaction. In plasma physics, CIA is used to study the properties of plasmas. CIA can be used to measure the temperature of plasmas, and to study the interactions between plasmas and other materials.

CIA is a powerful tool that can be used to study the properties of molecules and to develop new technologies. This book provides a comprehensive overview of the theory and applications of CIA in gases. This book is an essential resource for anyone who is interested in the field of CIA.



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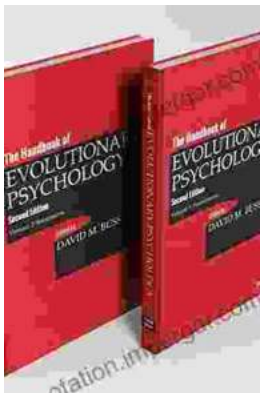

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