Propellants and Explosives. Thermochemical Aspects of Combustion. 3rd Edition

Description: Explosives and propellants contain considerable chemical energy that can be converted into rapid expansion. In contrast to the simple burning of a fuel, explosives and propellants are self-contained and do not need an external supply of oxygen via air. Since their energy content inherently creates the risk of accidental triggering of the explosive reaction, the correct synthesis, formulation, and handling during production and use are of utmost importance for safety, necessitating specialist knowledge on energetic materials, their characteristics, handling and applications.

This second edition of the classic on the thermochemistry of combustion covers the thermochemical and combustion characteristics of all important types of energetic materials, such as explosives, propellants, and the new class of pyrolants, as well as related phenomena. Addressing both experimental as well as theoretical aspects, it presents the fundamental bases of the energetics of materials, deflagration and detonation, thermochemical process of decomposition and combustion, plus combustion wave structures. The book also goes on to discuss the combustion mechanisms of various types of energetic materials, propellants, and explosives, based on the heat transfer process in the combustion waves. The burning rate models are also presented as an aid to understanding the rate-controlling steps of combustion processes, thus demonstrating the relationships of burning rate versus pressure and initial temperature.

Also new to this edition are five additional chapters providing updated coverage of significant recent developments in the field, as well as the major topic of such propulsion methods as duct rockets, ramjets, pulse motors and thrusters, while appendices on flow field dynamics and shock wave propagation have also been added.

From the reviews of the first edition:

"Propellants and Explosives provides a good survey of a field that is far from simple. The essential facts are presented systematically and in a clearly understandable way, helped by many figures and photographs...The book will provide the interested reader with an easy introduction to this complex subject." --- Angewandte Chemie Intl. Ed.

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