

Thermal Decomposition Of Solids And Melts

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Preface.-Abbreviations.-Introduction.-Part I. Thermal Decomposition: Primary Concepts: Mechanism: Congruent Dissociative Vaporization.- Direct Observation of Primary Products of Decomposition by Mass Spectrometric Methods.- Induction, Acceleration and Process Localization.- Nucleus Shape and Position.-Peculiarities of Structure and Composition of Solid Product.-Thermal Stability of Complex Gaseous Molecules.- Kinetics: The Arrhenius Equation.- The Hertz Langmuir Equation and Langmuir Diffusion Equations.- Modification of the Hertz Langmuir Equation as Applied to Decomposition Reactions.- Equilibrium Pressure of Products in the Equimolar and Isobaric Modes.- Equations for Calculation of the Absolute Rates of Decomposition.- Interpretation of the Arrhenius Parameters by the Use of the Langmuir Evaporation Equations.- Methodology: The Arrhenius-plots Method.- The Second-law Method.-The Third-law Method.- Approximate Evaluation of the Molar Enthalpies.- Reproducibility of Measurements.- Accuracy.- Measurement Time.- Part II. Interpretation and Quantitative Analysis of the Effects, Phenomena and Regularities Accompanying the Decomposition: Decomposition Conditions and the Molar Enthalpy: Ratio of Initial Decomposition Temperature to the Molar Enthalpy.- Thermal Desorption and Criteria for its Identification.- Impact of the Decomposition Mode and Reaction Stoichiometry on the Molar Enthalpy.- Decomposition of Carbonates in the Presence of CO₂.- Decomposition of Crystalline Hydrates in the Presence of H₂O.- The Self-cooling Effect: The Model of Temperature Calculation.- The Temperature Distribution in Powder Reactants.- Corrections to the Kinetic Parameters.- Experimental Evaluation of Self-cooling.- The Topley Smith Effect: Experimental Observations.- Modeling of the Topley Smith Effect for Li₂SO₄ . H₂O.- Modeling of the Topley Smith Effect for CaCO₃.- Impact of Vapour Condensation on the Enthalpy Change: The Contribution of the Condensation Energy to the Enthalpy Change.- Increase of the Enthalpy Change with Temperature.- Reactant Melting and the Decomposition Enthalpy.- Thermochemical Analysis of the Composition of the Primary Decomposition Products.- Effect of the Crystalline Structure of a Substance on the Composition of the Primary Decomposition Products: Oxides.- Nitrides.- Phosphorous, Arsenic and Antimony.- Evaporation Coefficients.- The Kinetic Compensation Effect.- Conclusions.- Part III. Thermal

Decomposition of Individual Substances: Instruments for Thermogravimetric Measurements.-
Measurement Conditions and Procedures for Thermogravimetric Studies: Evaluation of the Absolute Rate
of Decomposition.- Choice of the Decomposition Temperature.- Choice of the Residual Pressure of Air in
the Reactor (equimolar mode).- Decomposition in the Presence of the Gaseous Product (isobaric mode).-
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Some Substances: Non-metals (phosphorus).- Metalloids (arsenic, antimony).- Oxides.- Higher Oxides
for IV Group of Metals.- Sulfides, Selenides and Tellurides.- Nitrides.- Azides.- Hydroxides.- Clays.-
Hydrates.- Nitrates.- Sulfates.- Carbonates.- Oxalates.- Final conclusions.- Appendices: Fundamental
Physical Constants.- Atomic Masses of Elements.- Coefficients of Mutual Diffusion of Gases.- Spectral
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