

THERMAL ANALYSIS COMBINED WITH GAS ANALYSIS FOR MATERIALS SCIENCE IN SAINT PETERSBURG STATE UNIVERSITY

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The presentation is devoted to results obtained by methods of thermal analysis combined with gas analysis in different areas of Materials Science and Chemistry in Saint Petersburg State University during last three years. Brief review will be done on the description of opportunities for different methods of thermal analysis and calorimetry and a park of equipment of Centre “Thermogravimetric and Calorimetric Research”.

Thermogravimetry and simultaneous thermal analysis (TG +DSC) coupled with mass-spectrometry or FTIR-spectroscopy for gas evolution (TG 209 F1 Libra Netzsch with TENSOR 27 Bruker and STA 449 F1 Jupiter Netzsch with QMS 403 CF Aeolos) were attractively used for the investigation of formation and thermal stability of a number of new functional materials, nanomaterials and composite materials for different application (ceramics with magnetic and electric properties, synthetic and natural zeolites, catalysts and photocatalysts, organic-inorganic composites, framework compounds, membranes).

New complex methodology was proposed for the investigation of ion-exchange and intercalation which take place for layered structures in water medium and impact on properties of layered materials, for example on photocatalytic activity in reactions of water splitting with hydrogen producing or dyes degradation for water purification.

Advantages of TG coupled with mass-spectrometry for the quantitative analysis of the content of new promising hybrid organic-inorganic perovskite type compounds will be considered in comparison with XPS and CHN analysis.