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MASS SPECTROMETRIC STUDY OF THE ALKALINE-EARTH METAL PHOSPHATES THERMAL DISSOCIATION

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The study of the stability of polyvalent metal phosphates showed that at high temperatures they dissociate with a conversion of the phosphorus oxides into a vapour.

We have investigated the composition of vapour over magnesium, calcium, strontium and barium phosphates with the ratios $\text{MeO}:\text{P}_2\text{O}_5$ equal to 1:1, 1:2, 1:3 (Me = Mg, Ca, Sr, Ba). The apparent potentials of ions in the mass spectra were measured. Analysis of the experimental data has confirmed that the dissociation of metaphosphates with a transition of P_4O_{10} molecules into a vapour begins at about 900°C . The dissociation of pyrophosphates begins at 1100°C with the transition of PO_2 and O_2 molecules into a vapour. The vapour over orthophosphates at 1700°C consists of a mixture of PO_2 , PO and O_2 molecules.

At the temperature above 1750°C MeO , MePO_2 and Me molecules were found to be present in the vapour.

The standard enthalpies of formation were calculated for gaseous calcium, strontium and barium phosphates and were found to be equal to -428^{+6} ; -475^{+7} and -499^{+7} kJ/mole, respectively.