

HEAT INCREMENTS AND OXIDATION ENTHALPIES OF (Y,Pr,Gd)BaCo₂O_{6-δ} DOUBLE PEROVSKITES

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Complex oxides (Y,Gd,Pr)BaCo₂O_{6-δ} attracts researchers' attention due to it are promising materials for cathodes for solid state fuel cells. However, fundamental thermodynamic properties of these double perovskites such as heat increments, heat capacity and enthalpy of oxidation are not investigated so far.

Powder samples of (Y,Gd,Pr)BaCo₂O_{6-δ} were prepared using glycerol–nitrate technique. Phase composition of investigated double perovskites was controlled by X-ray powder diffraction. Then samples with composition GdBaCo₂O_{5.51}, PrBaCo₂O_{5.77}, YBaCo₂O_{5.33} were prepared by slowly cooling with speed rate 100 K/h, whereas sample YBaCo₂O_{5.0} was prepared by annealing at 1373 K and quenching.

Enthalpy increments of all as-prepared samples were measured by high temperature drop-calorimetry method on the SETARAM MHTC 96 calorimeter. Since YBaCo₂O_{6-δ} is stable only above 1123 K in air, calorimetry measurements were carried out in region 1123≤T, K≤1323. Oxidation enthalpies of (Gd,Pr)BaCo₂O_{6-δ} were measured by means of DSC sensors of MHTC 96 calorimeter at 1173K. Oxidation enthalpy of YBaCo₂O_{6-δ} was calculated from heat increments measurements. Obtained data allow us to calculate a heat capacity dependency from temperature for these compounds.

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