

A review study on thermochemistry of metal oxides relevant to nuclear energy

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To continue utilizing nuclear energy, nuclear waste management is a prerequisite. Metal oxides are materials for immobilization of many radionuclides including intermediate half-life nuclides such as Cs-137 and Sr-90, which are the fission products from U or Pu in radioactive waste. In nature, the mineral analogues of many metal oxides forms provide evidence of long-term stability. Thus, the study on chemistry-structure-energetics relationships of mineral analogues of metal oxides is of importance. Here, we review studies on thermochemistry of metal oxides using high temperature oxide melt solution calorimetry. The information on the enthalpies of formation for the metal oxide samples can provide the thermodynamic stability with changing composition due to radioactive decay, cation exchange, etc.