THE EFFECT OF THE MECHANICAL ACTIVATION ON THERMOPHYSICAL PROPERTIES OF POWDERED METALS

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We performed parallel measurements of specific heat and microstructure of a number of powdered metals after the mechanical activation in a high intensity planetary mill. X-ray diffraction and differential scanning calorimetry allowed us to establish that the microstructure and physicochemical properties of brittle and ductile metals change differently. The brittle metals, exhibiting a size reduction of particles during the mechanical activation, in particular tungsten, demonstrate changes in the microstructure leading to a reduction of the crystal lattice parameters and emergence of additional internal compression strains. The specific heat of such metals increases during the entire period of the mechanical activation process. Temperature dependence of the specific heat changes at the same time. In the ductile metals, exhibiting an aggregation of particles during the mechanical activation, the change in the microstructure leads to an increase in the lattice parameters and emergence of internal tensile strains. The specific heat in this case decreases after the mechanical activation during 5 to 21 minutes.