

Martensitic Phase Transition in Yttrium-Stabilized ZrO₂ Nanopowders by Adsorption of Water

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Abstract: The present study was aimed at revealing the influence of the mechanical stress induced by surface absorbed water molecules on the composition of crystalline phases in the ZrO₂ – 3mol% Y₂O₃ – nanoparticles. Neutron diffraction methods have been used to determine the phase transition. The fact of phase-structural $\beta \rightarrow \alpha$ transformation and the simultaneous presence of two polymorphic structural modifications (β is the phase of the tetragonal syngony and α is the phase of monoclinic syngony in nanoscale particles (9 nm)) under normal physical conditions is established by these methods.