

"Physico-chemical nanomaterials science"

Analytical description of degradation-relaxation transformations in nanoinhomogeneous spinel ceramics

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The mathematical models of degradation-relaxation kinetics are considered for jammed soft systems possessing nanoinhomogeneous inclusions embedded in inner-phase environment. This kinetics is shown to obey an obvious non-exponential behaviour, showing characteristic stretched-to-compressed exponential transition with decrease in the porosity of dispersive medium.

At the example of bulk and thick-film spinel ceramic composites based on mixed transition-metal manganites of principally different porous structure, it is shown that stretched exponential degradation kinetics is proper to own degradation transformations in uniform one-type systems (like mono-layered thick films) [1], while suppressed exponential kinetics with non-exponentiality index more than 1.0 is character for non-uniform systems including two or more different phases.

1. Klym H., Balitska V., Shpotyuk O., Hadzaman I. Degradation transformation in spinel-type functional thick-film ceramic materials // Microelectronics Reliability-2014.-**54**.-P. 2843-2848.

2. Shpotyuk O., Balitska V., Brunner M., Hadzaman I., Klym H. Thermally-induced electronic relaxation in structurally-modified $\text{Cu}_{0.1}\text{Ni}_{0.8}\text{Co}_{0.2}\text{Mn}_{1.9}\text{O}_4$ spinel ceramics // Physica B-2015.-**459**.-P. 116-121.