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Enthalpy-Entropy compensation – New insights into physical-chemical sense of entropy

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Enthalpy–entropy compensation is by far not just a senseless artefact. To realize this, we would need a completely new standpoint, starting from the notion of correlation. The latter is known to have two basic meanings: (a) 'X' is correlated to 'Y' means 'X' results from 'Y', or vice versa; (b) and this same might mean that there is some actual, but hidden, factor 'Z' in connection with both 'X' and 'Y'. In line with the interpretation (b), it is worthwhile to try rationalizing the compensation in terms of hidden, but physically-chemically real factors. When dealing with some experimental data, the 'hidden' factor(s) ought to be not directly measurable within the experimental set-up presently employed, so that further studies using other experimental/theoretical approaches might be necessary to reveal the 'hidden' factor(s) in question. Further, to correctly and fruitfully interpret the above-mentioned compensation results, we need to know what is, in effect, entropy. This problem is still far from being completely solved, but some progress has nevertheless been achieved.

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Biography

Evgeni B. Starikov has completed his PhD at the age of 27 years in Kharkov, the former USSR, and postdoctoral studies practically all over the world. He has published more than 90 papers in reputed journals, has been the corresponding editor of one book in the field of theoretical molecular biophysics, and serving as a peer referee and consultant.

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Processing & characterization of textured Barium ferrite ceramics

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As a result of technological developments, quite a large number of electronic equipment around and the communication devices place human beings literally in a jungle of electromagnetic (EM) waves. In order to absorb EM waves in a large frequency, barium hexaferrite (BaHF) ceramics which are produced as textured ceramics and processed in multilayer structures can be used. Textured ceramics are produced by using templated grain growth (TGG) phenomena. In order to obtain textured ceramics, BaHF powders and platelets are required in such a way that during sintering small size powders are directioned by large platelet surfaces. These ferrite powders are produced by mixed oxide method and the platelets are produced by molten salt synthesis method. Effects of calcination temperature, time, amount and type of the flux on the formation and morphology of platelets are investigated according to the x-ray and SEM results. Researches have shown that morphology control can be easily achieved by using KCl at low amounts compared to NaCl flux. However, at high amounts of NaCl, aspect ratio of the platelets is higher which is critical for TGG when compared to KCl flux. Moreover, activation energies of BaHF formation in both NaCl and KCl fluxes have been calculated and it is found that activation energy is higher in the case of KCl fluxing medium. After the synthesis, 5-8 wt % of platelet and 92-95 wt % of powder are mixed in a polymer solution. The solution then is tape casted and the polymer gets evaporated resulting in thin layer of BaHF ceramic tape (~ 200 μm). The ceramic tape is cut in different orientations and made multilayered structure for better electromagnetic wave absorption. These multi-layered structures are pressed for adhesion of layers, preheated and sintered. Degree and possible planes of texturing are detected by using different software analysis (Rietveld Analysis) and Electron Backscattered Diffraction (EBSD). Finally, all the production parameters are related with the electromagnetic wave absorption characteristics of the BaHF ceramics.

Biography

Eda Aydogan has completed her B.S. degree in 2010 from Middle East Technical University, Metallurgical and Materials Engineering. She started her MS. Degree at the same department while working as research assistant. She has been working on the thesis subject of 'Processing and Characterization of Textured Barium Ferrite Ceramics' for 2 years.