

**Report about research stay at Leibniz Universität Hannover (LUH),
Institut für Elektroprozessstechnik (ETP)**

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I am PhD student of Institute of physics, nanotechnology and telecommunications of Peter the Great Saint-Petersburg Polytechnic University. My general fields of interests is ferroelectrics, nanostructures, nanocomposites, low-dimensional systems. I was in Leibniz University of Hannover for research stay during 3 weeks in November-December 2015.

One of the objects of our research is nanocomposite materials of new type based on magnetic micro porous alkali borosilicate glasses. Magnetic atoms are located directly in a skeleton of matrix. Also such glasses have a 3 dimensional dendrite system of pores. It has been shown that such glasses exhibit magnetic properties. New type of multifunctional materials characterized by spatially separated of ferroelectric (material embedded into the pores) and magnetic (magnetic particles in the matrix skeleton) order parameter can be produced on the base of the porous magnetic glasses. Control of nanoparticles size, interface state gives ability of significant modifying of macroscopic physical properties of materials embedded into the pores.

Usually alkali borosilicate magnetic porous glasses are produced by melting in platinum crucible accompanied by continuous mechanical mixing, sol-gel methods or synthesis of magnetic particles directly within pores of matrix. All these methods are quite expensive and don't give a large amount of glass.

Production method developing in collaboration of our laboratory and laboratory of Thermische Prozesse und elektromagnetische Materialbeeinflussung of Institut für Elektroprozesstechnik is based on induction melting of batch in a graphite crucible which is heated inductively by radiofrequency generator. The bottom and sides of the graphite crucible transfer the heat to the batch. The proposed method allows obtaining large amounts of magnetic glass which is limited only by the size of graphite crucible and generator power.



So the aim of my visit was testing of the method and sample preparation by using equipment of the laboratory of Institut für Elektroprozesstechnik . I would like to notice that working process is organized on very high level, I had an individual comfortable place for work. I met a lot of great and helpful people, which can give all necessary information and I had not any difficulties with the language barrier: I don't know German language at all, but it didn't become a problem, because at LUH all workers speak English very well. Regarding of cultural aspect of my travel I found Hannover to be very nice and peaceful city with interesting architecture and wonderful atmosphere of German city. I had a very positive impression of my visit of Christmas Fair.

So the journey was a very good experience for me, gave great opportunity to improve my language skills, get to know new interesting people and collaborate with international colleague.