Prof. Abdellatif M. AlSharif

Research Experience and Interests:

My research experience focused in the past 30 years on preparation and characterizations of bulk and thin films magnetic or superconducting materials:

*My first encounter with the scientific research was in 1986 (at KSU toward my MSc. Degree under the supervision of Prof. M.J. O'Shea) when I started my first project to investigate the Gd-rich spin glass amorphous magnetic system. The splat cooling technique (at UN, Prof Sellmyer lab) was used to prepare the samples, and after which the structure and the magnetic behavior of the system were investigated using x-ray diffraction and the Vibrating Sample Magnetometer (VSM), (two published papers).

* In 1987, and after the discovery of the Cu-Oxide high T_c superconductors, I started working in Y- and Bi-based high T_c superconductors. I managed to prepare Bi-based SC using solid state reaction technique, and characterize its properties. A collaboration with a group at Chemistry Dept. (KSU, Prof. P. Sherwood) enabled us to identify the the different Oxidation states for Cu in Bi-based SC using X-ray Photoelectron Spectroscopy (XPS), (one published paper).

* Other important project in SC was one of the first efforts to make SC cables. A laser ablation technique was used to build a SC layer over C-fibers. The prepared samples where characterized and investigated (one published paper).

* The effect of elemental substitution in Y- and Bi-based SC (in place of Y in Y-based SC and in Cu in Bi-based SC) are other interesting project with interesting results were performed (three published papers).

*The Final project in SC material was to investigate the effect of neutron irradiation on Y-based SC. The nuclear research reactor at KSU (Prof. Merklin) was used to irradiate the samples with different doses, to study the effect of the structural defects (created by the neutron irradiation) on the critical current of SC materials (one published paper).

* In 1993 I visited Prof. O'Shea lab at KSU and we both collaborated in a research project, where a Cu-CuO multilayer system was prepared using rf sputtering and evaporation systems, then we studied its structure using X-ray diffraction and its magnetic properties using SQUID magnetometer. An interesting shifted and inverted hysteresis loops were observed for this system and it was discussed in a theoretical model. (two published papers)

* In 1993 I started building the magnetics research laboratory at Mu'tah University – Jordan. One can imagine the difficulty of this in an environment where there are no enough money and resources and no industry at all to support the scientific research. However, with much of struggle I managed to establish the nucleus of the lab and equipped it with the splat cooling sample preparation system and a tube furnace as an auxiliary device for annealing or sintering the samples. Later on I managed to buy a conventional VSM. A research grant from the high council of science and technology in Jordan enabled me to obtain the basic elements to start my research. It took me three years to build this lab and start doing research. Many research project were performed in this laboratory where my graduate students performed their scientific research under my supervision. All of these project were focusing on studying magnetic systems: ferrites, ferro magnetic or multiferroic materials. (Many papers were published).

* As seen from my short description of the many research projects I was involved in, that I have the base needed to participate fully and actively in the research projects with any group in your department, or to establish a new materials research group and contribute in its research advancement. Physics undergraduate students (besides Physics graduate students) can also participate effectively in materials research. Sample preparation is one of the research parts can undergraduate students participate in effectively. Their skills and knowledge will be widen and improved by introducing them to the different sample preparation techniques usually conducted in materials research, and understand the different mechanism that lead to a good sample. One more thing to add, as a researcher I can extend my hands to outside of my working place to nearby universities or research labs to collaborate with outside research group with the participation of some of my students.

<u>My current research interests involve:</u>

*Fabricating nano -magnetic particles compatible with human cells to be used in drug delivery.

This project is very important and many research support foundations, agencies and pharmaceutical industries will support such research after addressing them and explaining the importance and the benefits behind such research project.

*preparation and characterization of Bi based multiferroic materials.

*Using magnetized water in agriculture.