

Study of interplay between structure & magnetism in novel AMO₂ (A=Alkali metals; M=3d Transition Metals) advanced oxide materials exhibiting unconventional chemical & physical properties.

ABSTRACT

Probing the interplay between crystal structure and magnetism in new multinary oxides through the Rietveld refinement of high resolution synchrotron and neutron powder diffraction data has becoming increasingly critical for the advancement of science and technology in condense matter science. The seminar will highlight the brief summary of the (X+n) results collected at reputed European synchrotron and neutron diffraction facilities. Operando monitoring and deciphering the real-time (in-situ) chemical or structural changes and of magnetic phase transitions in series of new multinary oxides of 3d transition metals series will be presented. Focus will be to illustrate as how by changing the lattice dimensionality influence dramatically the thermodynamic properties by concerted study of the specific heat, magnetic susceptibility, magnetic phase transitions and allied spin fluctuations particularly at low temperature. Finally in order to construct a model for the spin interactions in these alkali oxometallates, the resulting magnetic properties will be justifiably analysed by employing various theoretical models.

BIO

Dr. Ali earned his Ph.D. (Dr.rer.nat.) degree from Max Planck Institute (MPI-FKF) for solid state research (MPI-FKF), Stuttgart Germany, where he also continued as a Postdoctoral fellow with fellowship from Max Planck Society. He is also the recipient of DAAD (German Academic Exchange Service) fellowship sponsoring his research stay at Federal Institute for Material Research Testing (BAM) Berlin, Germany. Besides he did sabbatical short academic stays at reputed Labs worldwide namely Brigham Young University, Provo UTAH, USA, ACNS, ANSTO Australia and large scale Synchrotron Light sources Worldwide specifically ESRF-Grenoble, France, Paul-Scherrer Institute PSI-Switzerland, & at Dan-Max Lab, MAX IV Lund Sweden. Currently He is working as Principal Scientist at National Centre for Physics (NCP), Quaid-I-Azam University campus, Islamabad Pakistan for the last ten years.

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