Contribution ID: **362** Type: **Oral Presentation**

Ion beam Modification and Characterization of Materials Two examples from measurements at the rib facility ISOLDE at CERN

Thursday, 6 July 2023 12:00 (1 hour)

Two initiatives drive our current research in ion beam modification of materials: a) Search for spintronic oxide and nitride semiconductors, i.e. semiconductors doped with very low concentrations (≤ 5 at. %) TM ions, the so-called dilute magnetic semiconductors (DMS), which if realized would have room temperature ferromagnetism (RTFM) coexisting with the charge carrier semiconducting functioning of the system, and b) Determination of the lattice occupancy of heavy ions implanted in diamond. Studies (a) were conducted in 57 Fe-emission Mössbauer Spectroscopy (eMS) measurements following implantation of precursor radioactive 57 Mn * ions into host substrates at the online radioactive ion beam facility ISOLDE at CERN. EMS measurements on ZnO show strong magnetic sextets in the spectrum but the magnetic field shows no dependence on temperature, hence ruling out ferromagnetic behaviour. Further measurements on ZnO pre-implanted with C, Ar, Fe and Co ions show similar results. In studies (b), over the years (since 1993) we have conducted Emission Channeling (EC) measurements on a range of radioactive (Li, P, Fe, Cu, Ce, Gd, Er) ions implanted in diamond. The lattice occupancy of the probe ions is extracted from channeling effects on the emitted decay products of the probe nuclei by the positively charged atomic rows of the crystal lattice. These lead to anisotropic yields of the -particles, conversion electrons or -
particles emitted by the nuclear probes with respect to the major lattice directions of the host. Sample results will be presented of eMS measurements on ZnO and of EC measurements on Er and TM ions implanted in diamond.

Apply to be considered for a student ; award (Yes / No)?

N/A

Level for award;(Hons, MSc, PhD, N/A)?

N/A

Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

Primary author: Prof. BHARUTH-RAM, Krish

Presenter: Prof. BHARUTH-RAM, Krish

Session Classification: Plenary 6

Track Classification: Track H - Plenaries