

Recent results from electron emission channeling on-line experiments

Wednesday 19 November 2008 09:50 (20 minutes)

This talk reports on the results from the electron emission channeling on-line run of the ECSLI collaboration, which took place during this year's Mn beam time in September. We were able to determine the lattice sites of implanted ^{56}Mn (2.6 h) in ZnO, Ge and GaAs, and of ^{61}Co (1.6h) in GaN during the run. We found that Mn in ZnO prefers substitutional Zn sites and Mn in Ge substitutional Ge sites. Mn in GaAs occupies substitutional sites as well, but distinguishing between Ga and As sites will only be possible after careful analysis due to the very similar nuclear charges of these two elements. For the study of Co in GaN we exploited the decay chain $^{61}\text{Mn}(4.6\text{ s})\rightarrow^{61}\text{Fe}(6\text{ min})\rightarrow^{61}\text{Co}(1.6\text{ h})$, i.e. ^{61}Mn was implanted and after a waiting period of 30 min lattice location was done on ^{61}Co . We found that Co occupies substitutional Ga sites in GaN. In addition, by means of using the decay chain $^{59}\text{Mn}(0.71\text{ s})\rightarrow^{59}\text{Fe}(45\text{ d})$, we prepared samples of SrTiO₃ and KTaO₃ doped with ^{59}Fe , for which the lattice location of Fe will be determined during the following months. Finally we prepared a number of InP samples implanted with ^{111}In (2.5 d) in order to do studies of the emission channeling effect as a function of measurement temperature. Measurements were made at 50 K, 100 K, 150 K, 200 K and room temperature. These experiments are intended as a test of our new sample cooling stage, and ^{111}In in InP has been chosen as a model system since the low Debye temperature of InP results in a strong temperature dependence of the emission channeling effect, and due to the fact that substitutional ^{111}In on In sites is not expected to suffer from any other temperature dependence than the InP lattice vibrations.

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Session Classification: Solid State Physics