

**Atomic disorder in sputtered thin films of  $\text{Co}_2\text{FeAl}_{1-x}\text{Si}_x$  Heusler alloys:  $^{59}\text{Co}$  NMR study**

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Half metallic ferromagnets are a very important group of materials due to their potential application as electrodes in the TMR and CMR based devices. For this application, full spin polarization and Curie temperature above RT are requested. Co based Heusler alloys ( $\text{Co}_2\text{FeZ}$ , Z=Al, Si) with  $L2_1$  structure are characterized by the highest Curie temperature among the materials which are theoretically predicted to display a full polarization at the Fermi energy. However, disorder phenomena play an important role for this class of compounds, as some types of antisites disorder destroy the half-metallic properties. Recent theoretical electron structure calculation have shown that the substitution of Al by Si in quaternary  $\text{Co}_2\text{FeAl}_{1-x}\text{Si}_x$  can be seen as an electron doping which stabilizes the Fermi energy at the middle of the minority gap and makes the half-metallic properties less sensitive to disorder effects. In this work we investigate the local structures around Co atoms in  $\text{Co}_2\text{FeSi}_{1-x}\text{Al}_x$  ( $x = 0, 0.5, 1.0$ ) Heusler alloys using  $^{59}\text{Co}$  NMR with spin echo method and discuss their effect on the tunneling magnetoresistance (TMR) for the junctions using  $\text{Co}_2\text{FeAl}_{0.5}\text{Si}_{0.5}$  electrodes.

9.7 cm

13.4 cm

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