Magnetic interactions in diluted magnetic semiconductors are in the focus of interest from the points of view of both science and technology. The doping of certain semiconductors with magnetic or non-magnetic ions can induce ferromagnetism. Room temperature ferromagnetism was observed with differently prepared Fe doped SnO$_2$ and TiO$_2$ [1-3]. In most of these cases a dominant paramagnetic doublet and a magnetically split component appeared in the $^{57}$Fe Mössbauer spectra, when the magnetic component was attributed to be the main source of ferromagnetism.

Samples of Sn$_{1-x}$Fe$_x$O$_{2-\delta}$ with molar ratios of $x = [\text{Fe}] / ([\text{Sn}] + [\text{Fe}]) = 0.0025$, 0.005, 0.01, 0.03, 0.05, 0.1, and 0.15, were newly prepared by a sol-gel method. In the sample with $x = 0.1$, annealed at 500°C, the ferromagnetism was undoubtedly observed at room temperature although its Mössbauer spectrum did not show any magnetic component, but only two paramagnetic doublets between 10K and 300K [4].

The aim of the present work was to get further information about the effect of doping and of magnetic interactions in Sn$_{1-x}$Fe$_x$O$_{2-\delta}$ and in FeSb$_x$Sn$_{1-x-y}$O$_{2-\delta}$ by the help of $^{119}$Sn Mössbauer spectroscopy.

$^{119}$Sn Mössbauer spectra of powder samples showed envelopes characteristic of a relatively broad Sn(IV) line. Small but significant differences can be found among the spectra belonging to different concentration and heat treatments.

The temperature dependence (between 20K and 300K) of spectra allows spectral decomposition both for two doublets (one of these with unusually high quadrupole splitting) or for a doublet and a magnetically split sextet due to a possible transferred hyperfine field. Selected samples were measured in external magnetic fields to elucidate the adequate decomposition. The results will be discussed in terms of magnetic interactions as an effect of the doping.