

**Mössbauer study of  $(\text{Fe}_{1-x}\text{Ni}_x)_7\text{Se}_8$** 

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$(\text{Fe}_{1-x}\text{Ni}_x)_7\text{Se}_8$  ( $x=0.02,0.05,0.08$ ) has been studied with Mössbauer spectroscopy and x-ray diffraction. The crystal structure is found to be a triclinic superstructure of the NiAs structure while  $\text{Fe}_7\text{Se}_8$  has a hexagonal structure. Abrupt change of quadrupole shifts near 122 K suggests that the spin-rotation transition proceeds abruptly, in contrast with the gradual transition reported for  $\text{Fe}_7\text{Se}_8$  with a triclinic superstructure. The iron ions at all four sites are found to be in a highly covalent ferrous state. Both Néel and Debye temperatures are found to decrease with increasing nickel concentration.