Title: Kinetics of martensitic transformation in a Ni<sub>45</sub>Co<sub>5Mn<sub>36.5</sub>In<sub>13.5</sub> and magnetic transition in an FeRh

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In chapter 5, it is shown that the \( M_s \) temperature strongly depends on the cooling rate in Ni$_{45}$Co$_{5}$Mn$_{36}$Si$_{13}$ alloy. The influence of the cooling rate on \( M_s \) is explained based on the time dependent nature of martensitic transformation.

In chapter 6, it is demonstrated that the first order ferro-antiferro magnetic transition in FeRh shows clear time dependence as observed in transformation of the Ni$_{45}$Co$_{5}$Mn$_{36}$Si$_{13}$ alloy. The transformation initiates after a finite incubation time, and transformation, which initiates in the heating process if the transformation is suppressed in the cooling process.

It is concluded from the present results that the first order transformation are essentially proceeds by a thermal activation process regardless of the its type. In diffusionless transformation such as martensitic transformation and first order magnetic transition, we may neglect the influence of atom diffusion if they occur below 100 K; nevertheless, the nucleation of the product phase requires a thermal activation process.