Chapter V

Conclusion

The powders of $Fe_{1-x}Co_xSi_2$ (x = 0, 0.01, 0.03, 0.05) was prepared by mechanical alloying method for 50 hours of milling time in Ar atmosphere. After cold-press and heat treatment at 900°C which varing time of 10 minutes, 1 hrs, 2 hrs and 4 hrs, the density was about 2.5 g/cm^3, less than the 50% single crystal value. It indicates that our samples have the porosity of about 50%. SEM shows that the sintering process did not happen fully. Our electrical transport is worse than that of literature as well as the power factor. XRD shows the formation of β-$FeSi_2$ and ε-FeSi in $Fe_{0.95}Co_{0.05}Si_2$ which heat at 900°C for 1 hrs, 2hrs and 4 hrs, β-$FeSi_2$ disappears but the ε-FeSi is still appearance. This result decrease thermopower values which is in range of 5-15 μV/K. The thermopower of sample with heat for 10 minutes is in range of 65-100 μV/K.

Further suggestions are

- Preparation should be used hot-press, because of the powders collected from mill are vary hard and do not density on simple heating [19].
- In our sample, XRD pattern of heated sample shows ε-FeSi and β-$FeSi_2$ which presents Si lose in preparing process. So the next preparation should be add Si powder to excess for compensate Si which may be lost during process of preparation.