Hyperthermia is a cancer treatment modality used as an adjunct to established therapies, like radiotherapy and chemotherapy.

The tumor core is frequently resistive to conventional treatments, like radiotherapy (since it is hypoxic) and chemotherapy (due to low drug supply).

*Synthetic features determine structure & magnetism in magnetic nanoparticles*

However, the increased blood perfusion induced by hyperthermia can enhance the damage of tumor cells at its center. Although hyperthermia has proven its efficacy with numerous phase III clinical trials, it has not gained the wide acceptance one would expect. The major technical problem is the difficulty in heating the tumor region to the intended temperature while sparing the normal tissue. It appears that this problem can be solved by introducing the concept of intracellular hyperthermia; it is possible to deliver submicron magnetic particles inside the tumor cells and let them generate heat under an alternating magnetic field.

In the current bachelor thesis Ni nanoparticles are evaluated as potential hyperthermia agents and compared with iron-oxide nanoparticles currently in use in such studies. Five different Ni nanoparticle solutions are studied in order to examine structure, concentration, field intensity, size effect on heating efficiency of colloidal suspensions under alternating magnetic field. The morphological, structural and magnetic profile of these systems is correlated with their thermal response via magnetic hyperthermia protocols. It is found that fcc Ni nanoparticles present potential as hyperthermia agents and may be alternatively used provided biocompatibility, toxicity issues are thoroughly addressed.