• For hardening steel is heated under a gas atmosphere in a muffle furnace. To ensure a high quality hardening result, the samples should be exposed to a time constant gas concentration and temperature.

• To guarantee over time a homogeneous temperature and velocity field and the optimal species concentration the muffle shall be simulated.

**Problem Description**

**Objectives & Tasks**

• The simulations shall be done with Ansys Fluent. This includes
  – the preparation and meshing of the geometry,
  – the setup for the conjugate heat transfer in the solid,
  – the flow setup with species transport and
  – the Joule heating of the furnace.

• The aim is to find the process parameters for the gas flow through the furnace to optimize the carburization of the samples.

• The applicant should have a strong interest for fluid dynamics and heat transfer problems.

Muffle furnace with samples in shelf