Magnesium stearate \( \text{Mg(C}_{18}\text{H}_{35}\text{O}_{2})_2 \) is a commonly used anti-caking agent in drug tablets. As it is always on the surface of the tablet, it is essential to know its structural stability under various ambient conditions, especially temperature and humidity. An instability of the used anti-caking agent may have serious impact to the production process or the storing conditions of a drug.

Four crystal forms of magnesium stearate are known from literature: anhydrous, monohydrate, dihydrate and trihydrate. Dihydrate is the most interesting for the pharmaceutical industry, since it shows the best anti-caking properties. Commercially available magnesium stearate very often contains more water than pure dihydrate, and it is very difficult to clarify by TGA or DSC experiments whether the surplus water is adsorbed water or crystal water.

The anhydrous form and the dihydrate will be exposed to controlled temperature and humidity conditions. The possible phase transitions will be monitored by using a temperature controlled humidity chamber mounted on an XRD instrument. The relations to thermal (TGA / DSC) experiments will be shown.