

Low temperature measurement of TbVO_4 with a closed cycle helium cryostat and a Stadi P

Phase transitions at low temperatures are of high interest for understanding material-property relationships. For example, superconductors have to be analyzed below their critical temperature.

The closed cycle helium cryostat manufactured by Advanced Research Systems has been adapted to a STOE Stadi P. It allows analyzing samples down to 5.5 K in reflection mode with X-ray diffraction methods.

The structural phase transition of TbVO_4 at about 32 K has been known for quite some time and is used as reference in low temperature diffraction experiments. The low-temperature phase is orthorhombic, the respective crystal structure is significantly different as clearly indicated by the splitting of different reflections in the powder pattern when cooling the tetragonal high-temperature form.

A paste-like mixture of TbVO_4 and silicone grease has been applied on the sample holder of the helium cryostat. The experiment has been performed after accurate evacuation of the shroud.

