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Automated sample change systems for thermal powder diffractometers

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At large-scale facilities, a growing demand for automated measurements in combination with mail-in services for samples has long since been observed. Automatized systems significantly improve the efficiency in the usage of measurement slots, and simultaneously also widen the scope of scientific applications. In particular, they enable to measure large series of samples prepared by different processing routes or varying the chemical composition. Small series of such measurements at room temperature have already been carried out at SPODI using a semi-automated 10-sample carousel, which is also the basis for the very successful rapid access program.

However, there is an increasing demand to extend rapid access measurements to non-ambient temperatures, in particular for measurements that only require one temperature point above and one below a certain phase transition temperature. These would benefit greatly from a fully automatized non-ambient sample changer.

Within the MORIS upgrade program, we plan employ a common pool of automatized sample environment for the three thermal powder diffractometers at SR8 at the FRM2, which is presented in this contribution. We plan to use a multi axis robotic arm as flexible sample changer for all temperatures at each instrument. The basic concept is the combination of a robot equipped by a sample magazine with dedicated sample environment. These must be suitable for automatic sample change at elevated and cryogenic temperatures.

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