

Panalytical Multi-Purpose Empyrean II Diffractometer

The Panalytical Empyrean II system is equipped with three position sensitive detectors: the X'celerator 1D, 1der (0D and 1D applications), and PIXcel^{3D} detector (with pre-mounted diffracted beam monochromator). The instrument also has a parallel beam X-ray mirror attachment for the analysis of rough or irregularly shaped objects and grazing incidence X-ray diffraction experiments. The system has been recently upgraded with an automated reflection-transmission spinner stage for reflection measurements with sample spinning. The Empyrean II system is also equipped with an Anton Paar HTK1200N high-temperature stage capable of running *in-situ*, non-ambient XRD experiments from room temperature up to 1200 °C. In combination with the high-T stage, the system is also connected to an inert gas (specific gasses can be supplied on request) supply and an Anton Paar turbo vacuum pump capable of achieving pressures of 10⁻⁴ mbar. The HTK1200N high-temperature sample holders are corundum (Al₂O₃). The methodology is best suited to powder samples, but other sample types (e.g., liquids and solids) can be accommodated.

Panalytical Multi-Purpose Empyrean III Diffractometer

The Panalytical Empyrean III system is equipped with two position sensitive detectors: the 1der (0D and 1D) and PIXcel^{3D} (0D, 1D, and 2D) detector. The system is further equipped with a complementary set of automated optics (Panalytical iCore and dCore) on both the incident and diffracted beam that enable (partly) automated sample alignment and are particularly well suited to thin-film sample measurements. The Empyrean III also has a 3-axis (chi, phi, z) eulerian cradle attachment for fine sample alignment and compensating for sample tilt. The system is further equipped with an attachable 2-bounce Ge monochromator for the incident beam, as well as HD fixed-slit and parallel beam mirror optics. The beam on the Empyrean III can be further focused using automated mask insertion at a minimum width of 0.2 mm (200 μm). The automated optics, coupled with the eulerian cradel and the PIXcel^{3D} detector (in 2D mode) enable ultra-fast reciprocal space maps (< 30 mins) and the efficient collection of pole figure measurements. The Empyrean III also has an automated reflection-transmission spinner stage and capillary mount attachment for reflection measurements with rotation, transmission measurements, and capillary mounted samples (liquids, gels, and air-sensitive materials).