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B-XRD1101 - High-T analysis - MiniFlex with HyPix-400 MF / BTS 500

Introduction

The MiniFlex benchtop X-ray diffractometer can be used with the HyPix-400 MF high-speed two-dimensional detector and the BTS 500 temperature-control attachment (manufactured by Anton Paar), which enables measurements from room temperature to 500°C. With this desktop system, you can observe a phase transition of a substance due to temperature change in real time.

Measurements and results

The diffraction pattern of magnesium chloride hexahydrate ($\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$) was measured while increasing the temperature, using the MiniFlex benchtop X-ray diffractometer, a HyPix-400 MF two-dimensional detector and a BTS 500 temperature control attachment (Figure 1). As the temperature rises, the specimen, which was a hexahydrate at room temperature, became a tetrahydrate at around 90°C, a dihydrate at around 140°C, a monohydrate at around 200°C, and magnesium chloride hydroxide ($\text{MgCl}(\text{OH})$) at around 270°C. The phase transitions due to dehydration were observed (Figure 2).

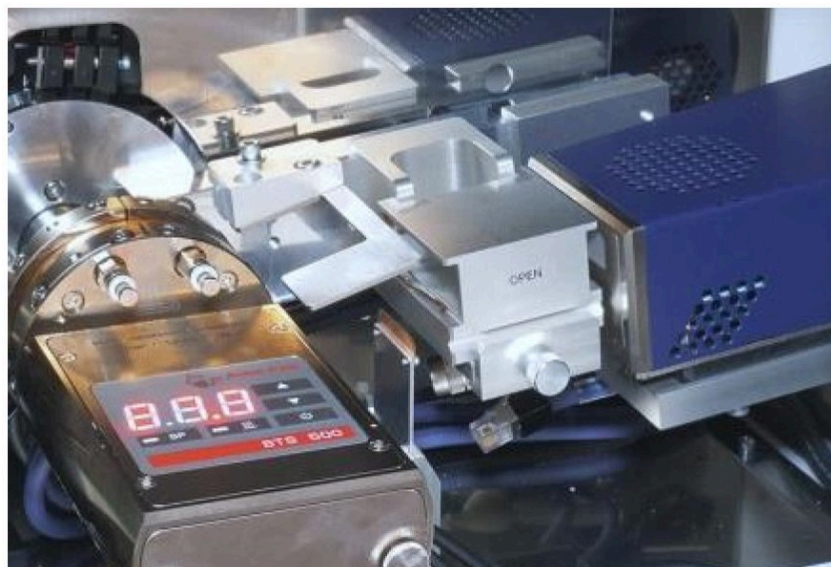


Figure 1: The BTS 500 and the HyPix-400 MF on the MiniFlex

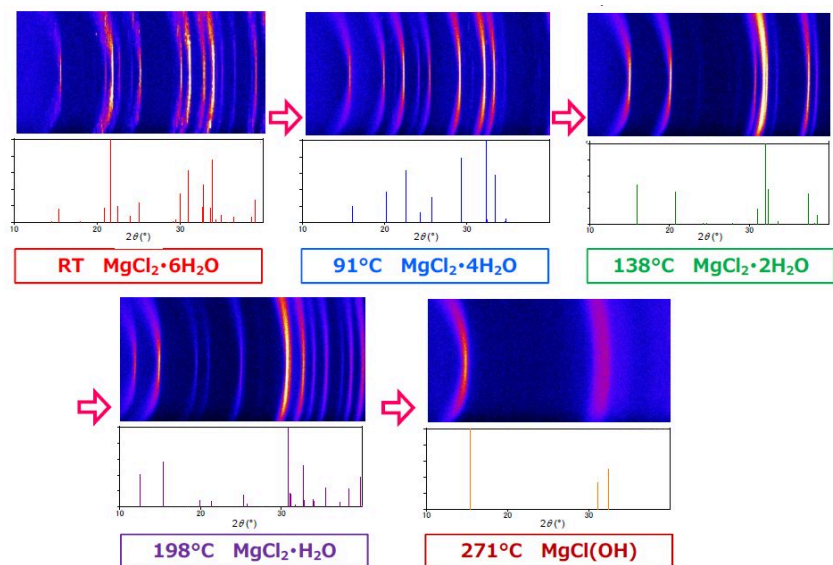


Figure 2: Result of temperature-controlled XRD measurement of magnesium chloride hexahydrate

Related products



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MiniFlex

New sixth-generation general purpose benchtop XRD system for phase identification and phase quantification