The Holy Grail of physical chemistry is to understand how the structure elicits certain physicochemical property. This is being done for truly fundamental reasons, or to help material chemists take advantage of the property and leverage it for applications. For single crystals, the best method to study the ordered crystalline structure of materials is by single crystal diffraction. This method is extensively used and it is common practice in almost every laboratory. But what happens when the crystals are too small? What happens if the crystals are cracked or twinned? These questions can be answered with powder diffraction. In this talk, we will discuss various examples where powder diffraction was the only alternative for detailed crystallographic experiments, and we will show how this method lead to interesting scientific discoveries.