The technique involves measuring the diffraction patterns of X-rays as they interact with the material's atomic lattice, providing insights into the crystallographic structure and phase purity.If the two waves superimpose in such a way that they are in phase (same crusts and troughs), then the resultant intensity is the sum of the two intensities, the phenomenon is known as constructive interference.On the other hand, in the destructive interference, two out of phase waves merged and the resultant intensity is the difference of two intensities.By measuring ?, d of every single crystallographic phase can be determined by comparing the data with the standard line patterns available in the Powder Diffraction File (PDF) database.XRD is the elastic scattering (no loss of energy during a collision) of X-rays by atoms of the materials.The resultant amplitude (intensity) of the scattered waves depends on the difference in the distance traveled by the waves, i.e. path difference (phase or angle).XRD analyzer plotted the x-y plot (XRD pattern) between intensity (in arbitrary units) and scattering angle, 2?This means that the planes with wider d appeared earlier in the XRD patterns where scattering angle is low.The principle of XRD is based on the interference of scattered waves.In XRD, the angle of the incident beam is varied to obtain all the possible reflections for a given sample.The wavelengths (?) of the X-rays (used in the XRD) are in the range of nanometers.