

The New Method Of Double Dilution For Quantitative X-ray Diffraction Phase Analysis Without Calibration Curves

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Abstract : The new method of double dilution can be used to analyse quantitatively all the phases of a multiphase system without the need to construct calibration curves, and with as few as 2 or 3 mixtures prepared for X-ray diffraction. A specific weight of the powdered specimen which is to be analysed, is mixed with a fixed proportion of internal standard. The standard can be any crystalline compound with a preferably symmetrical structure, not present in the original specimen. The other part to be mixed is a combination of finely ground pure phases or materials of known purity. Area under the diffracted peaks or integrated intensity is measured. At least two X-ray samples of known and different proportions should be employed.

Intensity ratio, Y axis, is plotted against weight ratio, X axis, so that a linear plot for combination of 2 peaks from each phase and standard is plotted. Required phase is read from the intercept of the abscissa. Mathematics of the method is discussed with an example of determining alumina, mullite, quartz and silicon in a ceramic test piece containing glassy phase.