MULTIPLE DIFFRACTION PEAK SPECTRA RESULTING FROM SINGLE CRYSTAL SUBSTRATES

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Single crystal substrates, such as silicon, are routinely used for coatings and devices. These thin-film samples are commonly submitted for analysis by x-ray diffraction. Powder diffraction scans of such nearly perfect materials result in numerous peaks, which are not generally matched by phase identification software. The numerous peaks observed in powder scans of (111) and (100) oriented silicon wafers irradiated with polychromatic radiation emitted by a standard Cu x-ray tube (a typical laboratory XRD configuration), have been completely matched, mainly to copper characteristic lines and tungsten characteristic lines. These sets of peaks so identified are found for any strong diffracting plane, and the appropriate 2theta positions can be determined based on the d-spacing of the substrate, and these results are applicable to any single crystal.

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