

Q: Why do we see a non-shifted peak at all angles?

A: In graphite, the outer electrons of the carbon atom are delocalized throughout the material. X-rays on striking these electrons noticeably change their wavelengths. However, the core electrons of the carbon atom are tightly bound to the nucleus. When X-rays strike these electrons, the effective mass that they collide with is much higher (closer to the mass of the nucleus than the mass of an electron). Since the shift in wavelength is inversely proportional to mass of the body which causes the scattering, X-rays on colliding with the core electrons are scattered with a negligible shift in wavelength. This causes the existence of a non-shifted peak at all angles