

K_β/K_α intensity ratio and total vacancy transfer probability of Cu through radioactive decay of Zn

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Abstract. Zinc-65 radioactive source undergoes radioactive decay through electron capture (EC) emitting K X-ray photons of copper. Adopting 2π -geometrical configuration, the emitted K X-ray photons were detected using a Si(Li) detector coupled to a 8K MCA. The emitted K X-ray photons were corrected for, intrinsic efficiency of the detector at the type of K X-ray photon energy, window attenuation and geometry correction due to solid angle subtended by the source at the detector. From the fit values of Hubbell et al. (1994) for K X-ray fluorescence yield of copper and the measured K X-ray intensity ratio, total vacancy transfer probability is calculated. The measured value is compared with K X-ray intensity ratio of Cu pure element by photoionisation. K X-ray intensity ratio measured through radioactive decay is found to be slightly on the higher side of the values obtained through Photoionisation and the theoretical value of Scofield (1969). The uncertainty in the measured values is less than 2%.

Keywords: 2π -geometrical configuration, Electron capture, K X-ray intensity ratio, Total vacancy transfer probability.