Local structure analyses of Zn in K-T boundary clays

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The Cretaceous–Tertiary (hereafter, K-T) mass extinctions, which occurred approximately 65.5 million years ago, has been thought to be due to a meteorite impact since Ir anomalies at the K-T boundary clay was found by Alvarez et al. In addition to Ir, the boundary clay is also enriched Zn, As, Sb and Cu.

In this study, local structure around zinc atoms in K-T boundary clays was determined by Zn K-edge XAFS spectroscopy. The radial structure function and XANES spectra for Zn atoms of K-T boundary clay sample and willemite (Zn2SiO4) are similar. The Zn-O interatomic distance in K-T clay is 1.953(3) Å and the Debye-Waller factor $\sigma^2$ which approximately coincides with result for tetrahedral Zn-O distances in minerals. Zn in K-T clay seems to form the Zn-O bond in a layer silicate and occupies a tetrahedral $\text{ZnO}_4$ site from a detail comparison from various kinds of zinc minerals.

**FIGURE 1.** XAFS spectra near the Zn K-edge for K-T boundary clays

**FIGURE 2.** XANES spectra near the Zn K-edge for reference zinc minerals and K-T clay.