Tungsten isotopes and concentrations in the Cretaceous - Tertiary (K-T) boundary samples at Stevns Klint, Denmark.

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A mass biological extinction occurred at the Cretaceous - Tertiary (K-T) boundary. There are several hypotheses to explain this crisis of about 65 Ma ago. Alvaretz et al. (1980) ascribed the extinction to the collision of a large extraterrestrial objects to the Earth based on the observed high concentrations of platinum-group elements in the K-T boundary samples. Other ascribed it to strong volcanic activities at the period.

Quitte et al. (2007) examined Os, W, and Cr isotopes in bulk sediments and spinel separates at three boundary sites: Bidart (France), Caravaca (Spain), Stevns Klint (Denmark) to put constraints on the nature of the impactor. They concluded that the impactors were similar to carbonaceous chondrites based on W and Cr isotope compositions in the spinels. The Os isotope compositions in spinels, however, agree with those of iron meteorites.

We determined trace elements concentration and tungsten(W) isotope composition in Stevns Klint (Denmark) using the acid leaching experiment (H2O2+HNO3, HCl, HF+HClO4+HNO3) to investigate distribution of the three elements and host phases.

Trace element concentrations were analyzed by ICP-MS (PQ-3) and tungsten isotope ratio was analyzed by MC-ICP-MS (Isoprobe, Neptune). Clay from the boundary layer was gound by an artificial quartz crystalline mill, which is best material with respect to limited contamination (Takamasa and Nakai, submitted).

Results of the leaching experiments show organic and/or sulfide fraction leached with H2O2+HNO3 included a large portion of Ag and Ir, while the silicate fraction leached with HF+HClO4+HNO3 does not include these elements. In contrast, tungsten is almost included in the silicate fraction.