

Comparative mineralogical and geochemical investigation of fossils from Mongolia and Korea

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Teeth of theropod, turtle's carapace, bivalvia and dinosaur's egg shell were excavated in Korea in 2002. International Mongolian Fossil Expedition found *Deinocheirus* and *Tarbosaurus* bones from 2006 to 2010. These fossils should have the same chemical features because the main parts are composed of apatite containing calcium and phosphorus elements. Fossils from Korea, however, are characterized with black and dark colors whereas fossils from Mongolia show light brown and white colors. In this work, we investigated mineralogical and geochemical correlations that determine the fossil's color using synchrotron X-ray techniques. In order to probe composing elements and mineral phases, we have used synchrotron-XRD, X-ray imaging at Pohang Accelerator Laboratory(PAL) and synchrotron-XRF at Stanford Synchrotron Radiation Lightsource(SSRL). From X-ray imaging data, we have distinguished secondary mineral phases from the original bone phase. XRF data of Korean fossils showed iron content in the range of 5 -10 wt.% along with strontium, magnesium and other trace elements in less than 1 wt.%. Though, XRD data show that fluorapatite is the common mineral phase of all the fossils, iron-bearing chlorite group minerals, bernalite, and goethite, are identified as dominant minerals associated with the dark portions in all Korean fossils. We suspect that different geochemical evolution of the fossilization sites determines secondary mineralization and thus the color of fossils.