

## An attempt on $^{14}\text{C}$ dating of carbonate hydroxyapatite in a cremated bone

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Bones are one of the most important materials for archaeological and paleo-environmental dating because they can directly provide absolute dates themselves. Bone collagen, which contains bone protein that is less susceptible to chemical weathering, is commonly used for  $^{14}\text{C}$  dating, but it sometimes has lost organic protein due to post-depositional chemical alteration and diagenesis, resulting in impossibility of  $^{14}\text{C}$  dating. For the bones remaining no organic component, carbonate hydroxyapatite, an inorganic component, is useful for  $^{14}\text{C}$ -measurement. However, the inorganic component in bones can easily be altered by acidic soil, and it has been considered to be unsuitable for  $^{14}\text{C}$  dating. Recently, meanwhile, it is reported that  $^{14}\text{C}$  dating using carbonate hydroxyapatite is possible for cremation bones heated at a high temperature ( $>600\text{ }^{\circ}\text{C}$ ). The objective of this study is to examine the possibility of  $^{14}\text{C}$  dating using carbonate hydroxyapatite in cremated bones. The samples used were cremated bones in a funerary urn, which are considered to be remains of Jokei, a Buddhist monk (AD 1155-1213). The bones had been confirmed to be burned at high temperature, judged from the IR spectra and XRD patterns. The carbonate hydroxyapatite in six bone fragments showed  $^{14}\text{C}$  dates of 1155-1280 cal AD, which is similar with the supposed age. The result indicates that  $^{14}\text{C}$  dating using carbonate hydroxyapatite is effective when the bone sample was enough heated and well-preserved after deposition.

Keywords: bone, carbonate hydroxyapatite, radiocarbon dating