

Cu chemostratigraphy of the Ediacaran in the Three Gorge area, South China

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The earth is only the planet, where higher forms of life exist. The Ediacaran-Cambrian transition is characterized by numerous events such as emergence of metazoans and disturbances of surface environment like Snowball Earth. The appearance and evolution of metazoans are the most important issue of the evolution of the earth and life, but the causes are still obscure. The stable isotope geochemistry of Cu is poorly known because of the lack of a suitable analytical technique. Thus, we try to establish the analytical technique of sedimentary rocks and obtain the secular change of the Cu isotope ratios of sedimentary rocks through the time.

Copper is one of the essential elements for life, especially for the hemocyanins in metazoans. The hemocyanins (also spelled haemocyanins) are proteins that transport oxygen throughout the bodies of some invertebrate animals including arthropods and some of molluscs. We study the copper cycle of seawater from the Ediacaran to early Cambrian because its sensitivity to redox allows us to obtain some new data about the evolution of the life. However, data of the copper isotope ratios from the Ediacaran to Cambrian ocean are quite limited.

We carried out on-land drilling of the sedimentary succession in Three Gorges area, South China. The drill core samples of black shales and carbonate rocks will be used for the chemical analyses. Now, we try to establish the copper isotope analysis using some standards. At first, samples are dissolved with aqua regia. Each sample was subsequently dissolved in 1 ml of 7 N HCl and insoluble particles were centrifuged out. The separation of transition elements on strongly basic anion exchange resins in hydrochloric media is a classical procedure (Kraus and Moore, 1953). Van der Walt et al. (1985) demonstrated that the macroporous form (AG MP-1) of strongly basic anion exchange resins has higher distribution coefficients for Cu(II), Fe(III) and Zn(II) in concentrated HCl.

At first, we will analyze Cu concentrations of the sedimentary rocks with ICP-MS, and we will analyze the Cu isotopic data in order to establish a new tool of Cu isotope chemostratigraphy in the Ediacaran.

Keywords: copper, concentration, chemostratigraphy, Three Gorges