The origin of the major carrie of noble gases in meteorites and its cosmo-geochemical implications

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【Outline of survey】

Noble gases are chemically inert and could be good tracers unrelated to chemical reactions to study the problems like the origin and the evolution of planets. "Noble gas geochemistry and cosmochemisty" is now admitted as a major research field in earth and space sciences. In this research field, it is very essential to examine where noble gases are trapped in meteorite because noble gases are chemically inert. Curiously, noble gases are not homogeneously distributed in the meteorite, but in a very tiny portion (0.004%) of the meteorite, named Q. It is now known that Q is a carbonaceous material and almost all heavy noble gases are in Q. In this study, we examine Q through the various kinds of aspects; laboratory experiment, physical and chemical separation of Q, isotopic measurements of light noble gases and Raman spectroscopy etc. We would like to clear the chemical and crystallographic form of Q and the trapping mechanism of noble gases in Q, and we will get the information on the various events in the early solar system.

【Expected results】

The phase Q is still puzzling. The isotopic composition of Q is a typical planetary-type and a representative one in the solar system. However, the material Q is not well understood. Why are noble gases that are chemically inert present in such a tiny fraction? If we could separate Q and could clear the origin and the form of Q, we get very important information on the origin and evolution of our solar system. through the trapping mechanism of noble gases in Q. Furthermore, we may get the information on the origin and evolution of the organic material from the identification of various forms of carbon materials in our solar system.

【References by the principal researcher】

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【Homepage address】 none