The Meteoritical Society

Meteoritics & Planetary Science 47, Nr 7, 1236–1237 (2012)
doi: 10.1111/j.1945-5100.2012.01386.x

Award

2012 Nier Prize for Frédéric Moynier

Frédéric Moynier has pioneered the use of the isotopic composition of transition metals (Fe, Ni, Cu, Zn) in geochemistry and cosmochemistry. One of Frédéric's major interests is to search for new constraints on the accretion and differentiation processes that are responsible for the diversity in composition and structure of planetesimals and planets. A key aspect of his research is to be always at the frontier of analytical developments for precise measurements of isotopic compositions by multi-collector inductively coupled plasma mass spectrometry (MC-ICPMS). In addition to this major field of research, Frédéric has contributed to several experimental and theoretical studies on the origin of non mass-dependent isotopic fractionations, and is promoting the use of the isotopic composition of transition metals in biology and medicine.

Frédéric Moynier was born on October 15, 1978, in Manosque (France), a city combining the beauty of the Alps and of Provence. After undergraduate studies in Marseille, he entered the Ecole Normale Supérieure (ENS) in Lyon where he got a strong background in mathematics, physics, and chemistry, in addition to geology. Frédéric got into the physics of core formation during his master's degree in geophysics under the supervision of Francis Albarède and Yannick Ricard. He stayed in ENS Lyon for his Ph.D. under the supervision of Francis Albarède, and got involved into isotopes and MC-ICPMS.

During his doctoral work, Frédéric developed unique skills to measure and interpret the isotopic composition of terrestrial and extraterrestrial material by MC-ICP-MS, and applied it to many original projects. His "reputation" in Lyon dates back to the fact that, once, he was capable of developing the chemistry and mass spectrometry for a given element in 1 week, picking up an idea that emerged at a discussion at a coffee break. He developed the measurement of Ni stable isotopes in meteorites, and built the first isotopic systematic of Ni for extra-terrestrial samples. The Eu isotopes measurements he made on calcium-aluminum-rich inclusions (CAIs) enabled him to develop a new model of isotopic fractionation by electromagnetic sorting in the young solar system. As a Ph.D. student, Frédéric began

his study of Cu and Zn isotopes for which he is now recognized as an expert in the community. His first papers on the Zn and Cu isotopic compositions of lunar materials showed that the lunar regolith was enriched in heavy isotopes of Zn and Cu by evaporation due to meteorite impacts. In addition, it showed that the isotopic fractionation between lunar basalts and bulk silicate Earth could be used to constrain the nature of the Moon forming event, a subject on which he made a big step very recently with his Ph.D. student Randy Paniello. It was also in Lyon that he developed his work on mass-independent isotopic fractionation with Toshiyuki Fujii from the University of Kyoto and got involved in the question of the possible presolar inheritance of some of these isotopic variations.

Frédéric moved in 2006 to the University of California Davis, for a postdoctoral stay with Prof. Qing-zhu Yin. He developed there the first measurements of Cr isotopes by MC-ICPMS to use short-lived ^{53}Mn to date planetary accretion. Having participated at Lyon with Audrey Bouvier's Pb-Pb isotopic studies of CAIs, he became involved again in dating Ca-, Al-rich refractory inclusions at UC Davis by collaborating in Benjamin Jacobsen's work on short-lived ^{26}Al.

In 2008, Frédéric Moynier became an assistant professor at Washington University in St. Louis where he is leading the isotope geochemistry laboratory that he developed to measure with high precision the isotopic compositions of a variety of "non traditional elements" in meteorites and lunar rocks. He is using subtle variations of the isotopic composition of Zn, Cu, Fe, and Sr to study the condensation and evaporation processes that shaped the composition of the earliest solids of the accretion disk, of planetesimals and planets. This extends to the study of the evolution of the lunar regolith, volcanic activity on the Moon, and recent impact processes on Earth, which he also tried to track using W isotopic compositions. Recently, Frédéric got involved in the search for carriers of presolar isotopic anomalies, a subject where he benefited from his long-term experimental and theoretical work on "anomalous" isotopic fractionations. Frédéric is a quick mover able to make significant advances in various fields using key isotope systems, as shown, for instance, by his recent Cr isotopic study constraining the Cr content of the core of the Earth. Finally, it is important to stress that Frédéric's curiosity and creativity are not restricted to Earth and planetary sciences. He is, for instance, developing studies on the isotopic composition of Zn and Fe in plants and animals to constrain their different metabolic pathways, and who knows what he will measure next week?

This is a great year for Frédéric as he was also honored by the European Association of Geochemistry, which awarded him the Houtermans medal for young outstanding geochemists. It is a pleasure for me to present Frédéric Moynier as the recipient of the 2012 Nier Prize of the Meteoritical Society.

Marc Chaussidon
Centre de Recherches Pétrographiques et Géochimiques, Nancy, France