

TERRESTRIAL SOURCES OF REDUCED PHOSPHORUS. K. J. Rodzinyak¹, N. L. La Cruz¹, J. M. Sampson¹, D.A. Lindsay¹, A. C. Garong¹ and M. A. Pasek*, ¹School of Geosciences, University of South Florida, Tampa, Florida krodzinyak@mail.usf.edu

Introduction: Phosphorus is found predominantly as orthophosphate minerals on the surface of the Earth. Phosphorus is an important element in living organisms as it makes up genetic material forming the backbone of DNA and facilitates energy transfer through the energy currency ATP. Owing to its ubiquity, phosphorus was likely one of the elements that limited the origin of life [1].

Early Earth: Reduced forms of phosphorus are more reactive and therefore potentially more prebiotically relevant on the early earth [1, 2]. Studies of prebiotic chemistry have shown that phosphorus can become available from schreibersite, an iron nickel phosphide found in meteorites which is considered the likely dominant source [3, 4].

Terrestrial phosphides: The occurrence of terrestrial phosphides is rare. There have been trace amounts found in glasses produced in lightning strikes, pyrometamorphic rocks in Levant, and in native iron in Greenland and some garnet peridotites in China [5-7]. Due to the rarity of terrestrial phosphides, meteorites have been hypothesized to play the predominant role in the delivery of reactive phosphorus to the early Earth.

Josephine Ophiolite: This project focuses on potential terrestrial sources of reduced phosphorus in the Josephine Ophiolite in the Klamath Mountains on the Oregon-California border. The Josephine Ophiolite is a 162 million year old section of oceanic crust that was forced to the top of the continent about 155 million years ago [8]. There are iron nickel deposits that were formed during serpentinization of the peridotites and ophiolites. The josephinite is thought to have been formed during low temperature water-rock interactions [9]. Learning more about the distribution and occurrence of phosphorus minerals throughout the Earth will aid in the understanding of the origin of life.

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