

The process of oceanic serpentinization: from seafloor hydration to subduction dehydration

ZHAOXIA JIANG¹, YUZHEN ZHANG² AND SANZHONG
LI³

¹Frontiers Science Center for Deep Ocean Multispheres and Earth System, Key Lab of Submarine Geosciences and Prospecting Techniques, MOE, College of Marine Geosciences, Ocean University of China

²Frontiers Science Center for Deep Ocean Multispheres and Earth System, Key Lab of Submarine Geosciences and Prospecting Techniques, MOE, College of Marine Geosciences, Ocean University of China, Qingdao 266100, China

³Frontiers Science Center for Deep Ocean Multispheres and Earth System, Key Lab of Submarine Geosciences and Prospecting Techniques, MOE and College of Marine Geosciences, Ocean University of China, Qingdao, 266100, China

Presenting Author: jiangzhaoxia@ouc.edu.cn

As one of the most important water-rock interactions on earth, serpentinization refers to the hydrothermal alteration of mafic and ultramafic rocks under medium-low temperature conditions. Serpentinization is mainly the water-rock metasomatism of olivine, orthopyroxene and amphibole and other magnesia end-member. Three kinds of serpentine group minerals include lizardite, chrysotile and antigorite, which reside at different temperatures, e.g., lizardite at low temperature but antigorite at high temperature. Serpentinization process is controlled by temperature, the degree of redox, pH value, water-rock ratio (W/R), etc. In general, serpentinization is prone to occur at the areas with the thinning of the crust or the existence of faulted structures where mantle materials are easy to expose to contact and react with fluids. The serpentinization degree is generally quantified by the rock microstructure and geochemical methods, however, magnetic parameter is a prospective proxy for the serpentinization degree. Serpentinization makes a certain contribution to the marine magnetic anomalies, the biological evolution process on the earth, and the mineralization, in particular to the dehydration at the subduction zone and the formation of arc magma. However, much more investigations on the detailed mechanism are needed in the future work.