Dissolved fluorophore production from lipid-protein oxidation reactions

L.M. MAYER AND L.L. SCHICK

Darling Marine Center, University of Maine, Walpole ME USA (Lmayer@maine.edu, Lschick@maine.edu)

We examined the production of dissolved fluorescent material during bacterial decay of algal cells. Humic-like fluorophores appeared upon bacterial attack, replacing largely proteinaceous fluorophores initially present. Algal membranes were especially productive of fluorophores. Two possible mechanisms of fluorophore production were assessed. Decay of tryptophan can produce compounds with fluorescent compounds similar to those observed, but analyses found none of the predicted tryptophan oxidation products and this hypothesis was therefore abandoned. An alternate pathway of lipid oxidation and formation of adducts with amines proved more fruitful. Lipid peroxides appear in solution just prior to the onset of humic fluorophores. Addition of a hydrophobic antioxidant strongly inhibited production of humic fluorophores during algal decay, consistent with a lipid oxidation pathway. In model compound experiments, conjugation of a variety of lipid peroxides and aldehydes with amine-containing compounds yielded 3D, excitation-emission, fluorescence spectra similar to those found in algal decay experiments and in the oceans. This lipid oxidation pathway thus shows promise as a reasonable candidate for fluorophore production.

REE Geochemistry of late Proterozoic shallow marine carbonate, India

A.MAZUMDAR[1], I. KAWABE, K. TANAKA, T. TAKAHASHI

Department of Earth and Planetary Sciences, Graduate School of Environmental Studies, Nagoya University, Chikusa, Nagoya 464-8602, Japan [1](aninda@gcl.eps.nagoya-u.ac.jp)

Partitioning of Rare earth elements (REEs) in carbonate sediments, the post-depositional processes responsible for the elemental enrichment and the resulting abundance patterns are not well understood. In the present study we have measured REE abundances in terminal Proterozoic carbonates of Bilara Group (Nagaur-Ganganagar Basin, western India) and Krol Formation (Krol Belt, Lesser Himalaya). Bilara and Krol carbonates represent shallow marine tidal flat facies. Deposition of Bilara carbonate took place in an evaporative basinal condition whereas the Krol basin was characterized by relatively open marine condition. Figure1A and B are representative C1 chondrite-normalized abundance patterns. REE plus Y concentration in our carbonate samples range from 0.8 to 9 ppm with majority of the samples lying below 4ppm level. $(Y/Ho)_{CHN}$ ratio varies form ~1 to 1.8. C1 chondrite normalized REE abundance patterns show variations from shale-like to seawater-like.. Based on end member mixing calculations, we attribute the observed range of patterns to mixing of colloidal components (with shale like REE distribution) with Seawater and post depositional interaction (diagenesis) of carbonate grains with the pore water solution.