Microbial sulfate reduction is a global process that takes place preferentially in coastal marine environments. Figure 1 (Bowsles et al., 2014) shows the global estimates of marine microbial reduction rates. From this figure, it is evident that sulfate reduction is widespread and that reduction rates increase along continental shelves and coastal margins relative to the middle of the oceans. Considering sulfate salts are soluble in water and have high concentrations in ocean water, making dissolved sulfate higher than molecular oxygen in sediments, microbial sulfate reduction becomes the most important mineralization pathway for organic matter in marine sediments and also controls oxygen levels (Rickard, 2014).

The EDS spectra collected were consistent with the presence of pyrite and an iron sulfur mineral (Fig. 8) in all four cultures with bacteria present. In addition, to the pyrite and iron sulfur, there is an iron phosphorus mineral in the cultures, more analysis will need to be completed to determine which iron phosphorus mineral it is.

The proposed mechanism was that in the presence of S° the pyrite formed would have a δ34S value that equals to that of S°. In figure 14.1 shows just that the red triangle has a value closer to the elemental sulfur values obtained from this experiment, indicating a role of S° just like in the Archaeon Eon (Figures 13 & 14). Figure 13.4, also displays the arrow of the pyrite (blue triangle) formed in the absence of S°. This value shows a similar value to that of the FeS3O4, square formed, indicating that without S° there is no exchanging, only reactions.