

## **Hydrothermal processes recorded by pyritic-organic-rich laminae in the 3.4-Ga Buck Reef Chert**

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Organic-rich laminae of the 3.4 Ga Buck Reef Chert have been interpreted as fossilized microbial mats. The presence of anoxygenic photosynthesizers was inferred from their carbon isotopic composition, their restriction to shallow water marine paleoenvironments, the presence of siderite and the absence of iron oxides. Here, combining mineralogical data, molecular compositions of the organic-rich laminae, and sulfur isotopic compositions of the associated pyrite crystals, we investigate the geological history of these laminae and their paleoenvironmental significance. Altogether, our data indicate that late fluid circulation was significant during the formation of the pyritic-organic-rich laminae and their host sediments.