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# Possible Role of Microbial Polysaccharides in Nontronite Formation

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**Abstract:** Nontronite and microbes were detected in the surface layers of deep-sea sediments from Iheya Basin, Okinawa Trough, Japan. Nontronite, an Fe-rich smectite mineral, was embedded in acidic polysaccharides that were exuded by microbial cells and electron microscopy showed that the nontronite layers were apparently oriented in the polysaccharide materials. We propose that the formation of nontronite was induced by the accumulation of Si and Fe ions from the ambient seawater and that extracellular polymeric substances (EPS) served as a template for layer-silicate synthesis. Experimental evidence for this hypothesis was obtained by mixing a solution of polysaccharides (dextrin and pectin) with ferrosiliceous groundwater. After stirring the mixture in a sealed vessel for two days, and centrifuging, Fe-rich layer silicates were identified within the precipitate of both the dextrin and pectin aggregates, whereas rod-shaped or spheroidal Si-bearing iron hydroxides were found in the external solution. Microbial polysaccharides would appear to have affected layer-silicate formation.

**Key Words:** Biomineralization • Extracellular Polysaccharides • Microbes • Micromorphology • Microstructure • Nontronite

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