served forming large portions of the specimens collected, or replacing crystals of sulfides, result from low-temperature alteration of preexisting sulfide phases.

The principal silicates are hydrated amorphous silica and iron-silicon nontronite. Minor amounts of muscovite and zeolite were scattered throughout the samples. The sulfates consist mainly of Cu,Fe- and Zn-bearing phases. Small amounts of barite were also detected.

The sulfide deposits described here were probably formed in the axial part of the East Pacific Rise near 21°N during a period of magmatic quiescence. The nature of the polymetallic sulfides, the structural setting of the deposits, and the sulfur isotopic data suggest that they had a magmatic source. The massive sulfide deposits were probably formed by mobilization of sulfide-bearing material and by some reduction of seawater sulfates during fluid circulation in the oceanic crust. Whether the sulfide-bearing material was extracted from basaltic rocks or represents a sulfide melt segregated during the solidification of a silicate melt under the axis of the East Pacific Rise is not yet known.

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