

Petrographic observation of the 3.2 Ga hydrothermal origin black chert vein. _Dixon Island Formation, Western Australia-

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The 3.2 Ga Dixon Island Formation in the Cleaverville Group of the coastal Pilbara terrane is one of the best sequences preserving Archean hydrothermal stratigraphy and of containing bacteria-shaped materials. There are many hydrothermal related carbonaceous siliceous veins swarm in this sequence. We focus the carbonaceous black chert vein in the rhyolite tuff member in the Dixon Island Formation.

Based on the field observation, there are two types black chert vein in this formation. One is massive very dark black siliceous vein which intruded at early stage of the hydrothermal event. Second is more siliceous black chert vein that contains many rhyolite and old black chert fragments. These black chert veins are intruded by fine silica veins.

Petrographic examination reveals black carbonaceous materials in the black chert vein. Carbon material formed fine carbon grain which is less than 1-micron meter. Most black carbon formed an aggregate material which subdivided two types. Aggregate A is well-rounded light black spheroid and aggregate B is angular shape dark black material. Aggregate materials usually contain many tourmaline and muscovite.

We distinguish three types of veins in these black chert vein swarm. Type I is massive very dark vein, which contains many aggregate materials with tourmaline and muscovite. This type is earliest veins in this volcanoclastic sequence. Type II is a massive dark vein, which contains aggregate B materials. Type III is a more siliceous vein than other type. It formed few carbon and very fine quartz with coronal shape texture. Type II and III are later veins than Type I. Type I vein is very similar to the basal part black chert of the Black Chert Member. It is strongly suggest the massive black chert in the Black Chert Member deposited from Type I vein origin materials.