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Mineralogical characteristics of the bauxite deposits in the southeast of Yunnan, China

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Abstract: Bauxite is the primary source of aluminum metal, this ore is usually reddish to brown in color in

nature. It is formed through a process of weathering, leaching, and deposition. Deposits of bauxite are often

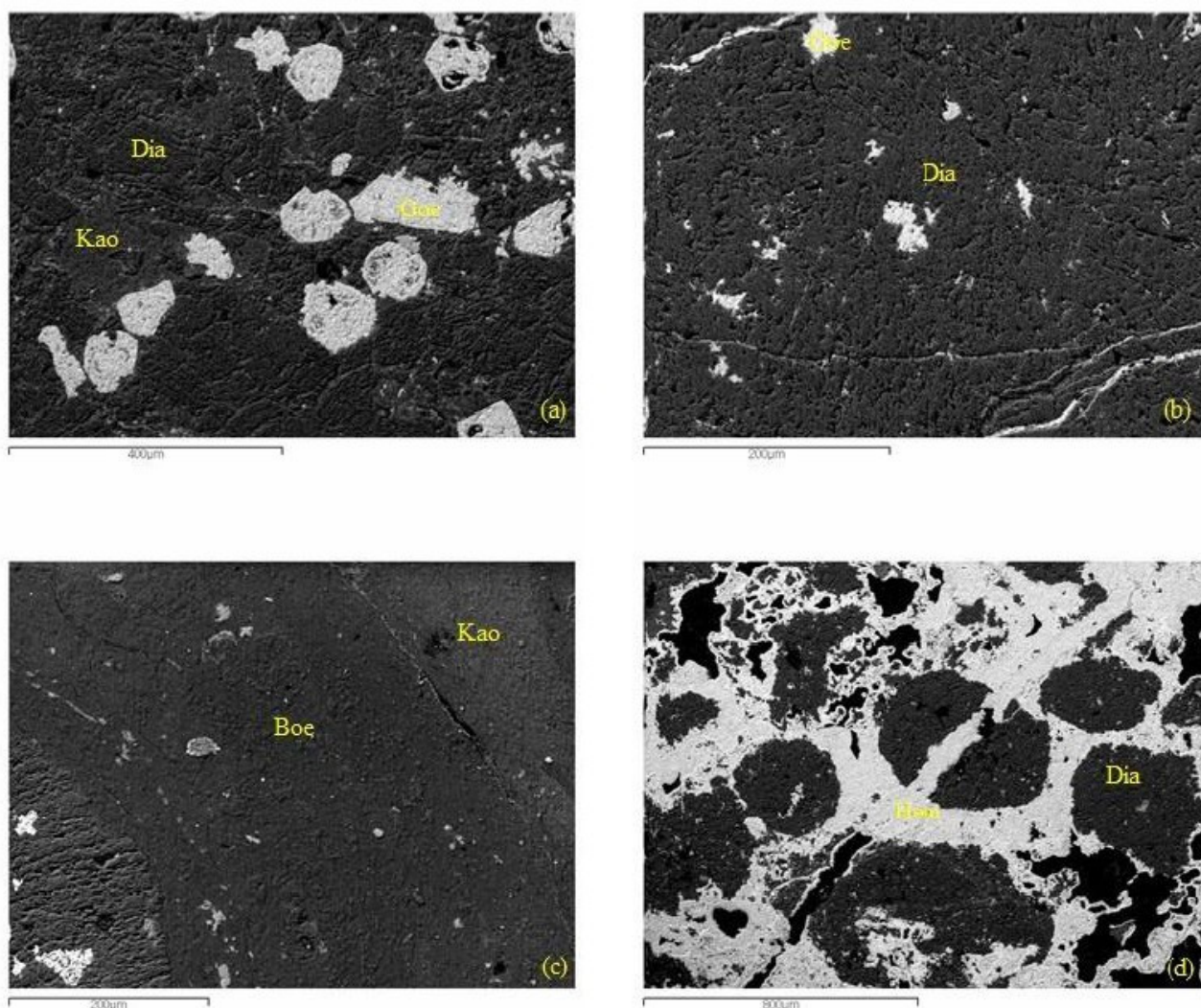


Fig. 1. SEM micrographs of bauxite ores.

(a) diasporites are surrounded by kaolinite aggregates; (b) goethite and diaspore coexisting in the matrix; (c) kaolinite coexisting with boehmite; (d) ooids with diaspore surrounded by hematite. (Dia-diaspore, Kao-kaolinite, Goe-goethite, Boe-boehmite, Hem-hematite).

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Table 1 Mineralogy of bauxite in the southeast of Yunnan, China.

No.	Sample No.	Mineralogy						
1	D12-b1	Diaspore		Goethite	Hematite	Anatase		
2	D13-b1	Diaspore				Anatase	Rutile	Kaolinite
3	D18-b1	Diaspore			Hematite			
4	D96-b1	Diaspore			Hematite	Anatase		Ilite
5	D96-b2		Boehmite	Gibbsite	Hematite			Kaolinite
6	D96-b5		Boehmite		Hematite	Anatase		Kaolinite
7	D96-b7	Diaspore	Boehmite		Goethite	Anatase		Ilite
8	D96-b8	Diaspore	Boehmite	Gibbsite	Goethite	Hematite	Anatase	Kaolinite
9	D96-b9							Calcite
10	D46-b1	Diaspore			Goethite		Anatase	Kaolinite
11	D46-B2	Diaspore	Boehmite			Hematite	Anatase	Kaolinite
12	D50-b1							Calcite
13	D50-b2	Diaspore				Anatase		Kaolinite
14	D50-b3	Diaspore				Anatase		Kaolinite
15	D51-b1	Diaspore	Boehmite			Anatase		Kaolinite
16	D52-b1	Diaspore	Boehmite			Anatase		Kaolinite
17	D52-b2				Goethite	Anatase	Rutile	Kaolinite
18	D52-b3	Diaspore			Goethite	Anatase	Rutile	Kaolinite
19	D52-b4	Diaspore			Goethite	Anatase	Rutile	Kaolinite
20	D52-b5	Diaspore			Goethite	Hematite	Anatase	Rutile
21	D52-b6	Diaspore	Boehmite			Anatase	Rutile	Kaolinite
22	D52-b7	Diaspore				Anatase	Rutile	Kaolinite

Note: Collecting localities: 1(Zhewushe village); 2(Tuobaini); 3(Yangliujing); 4-8(Hongsheke, Yan mountain); 9-15(Feijiaochi, Qiubei, Wen mountain); 16-22(Iron mines, Qiubei, Wen mountain)

found near the surface of the Earth. The orebodies of bauxite deposits in Yunnan area with respect to specific tectonic units, especially for the mineralization point of Nyainqentanglha folds system edge, and the period of Variscan cycle is the mainly stage of forming bauxite deposits. The sedimentary interruption between the Permian-Carboniferous, and lower-upper Permian, is the critical condition of forming palaeo-weathering crust and cumulating of bauxite. This work is to identify the minerals of bauxite in Yunnan area, to observe the texture of the minerals, and to define mineralogical change during the bauxite forming process by using XRD analysis and SEM-EDX (Scanning Electron Microscope-Energy Dispersive X-ray analyzer). We classified 20 samples into 6 groups based on the mineral assemblages from bulk XRD analysis results. The Al-containing minerals such as diaspore, boehmite and gibbsite, are dominant phases in the most of samples, mixed with two iron oxides (goethite and hematite), kaolinite, and small amounts of anatase and rutile (TiO₂). By observing the thin sections and using SEM-EDX analysis, it shows that all the bauxite layers have similar mineralogy and their main textures are pisolitic-ooide, ooide-spheroid and pisolitic(Figure 1). We found diaspore, boehmite, gibbsite and kaolinite could coexist in one sample by different combination(Table 1), that's cause of different geological conditions. The future work is focused on confirming the conditions of making mineral phase changes.

Key words: ore-forming condition, XRD analysis, SEM-EDX analysis, mineral phase changes.

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