

New Au-U deposit type in the weathering crust in tectonic-metasomatite zones of Pre-Cambrian shields.

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Au-U mineralization is widely distributed in the tectonic-metasomatite zones of Pre-Cambrian shields (Aldan Shield, Ukraine Shield and others). The industrial ores are located only in several areas at depths of more than 150-300 m. The Uranium mineralization is represented by uranotitanates and the gold mineralization –by auriferous pyrite.

The lineal crust of weathering is present to the depth of 100-150 m. The feldspars are replaced by the clay minerals, carbonates are evacuated, sulfides are oxidized and the secondary minerals of uranium replace uranotitanates. The golden mineralization in the crust of weathering is represented by the fine-grained native gold. The particles' size is 40-50 nm. Uranium mineralization: relic brannerite, tuyamunite, torbernite, carnotite. The gold content is 1-2 g/t, uranium content is 0.01-0.05%.

Ore bodies of gold and uranium are located inside the tectonic-metasomatite zones. The maximum contents of these metals may not coincide. The golden ore bodies have the length of hundreds meters and a thickness of 1-5 m. The vertical extent of the secondary Au-U mineralization is 100-150 m.

20 laboratory samples of ore from the weathering crust were tested by the method of heap leaching. The first stage is the uranium leach by diluted sulfuric acid. The second stage is the cyanation of gold and silver.

The following experimental data was received: the leach rate of uranium is 75%, gold 80-97%, silver 50-60%. Gold resources in the lengthy zone are 80 t. Gold resources of the several zones inside the area of 100 km² are estimated as 220 t.

The heap leach process can be used for profitable development of the poor deposits. This method helps to increase the resources of gold and uranium.

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