

SPECTRAL EVOLUTION

Using a field spectrometer for cobalt exploration

Cobalt is a lustrous gray to silver metal that is very hard, retains strength at high temperatures and is capable of being magnetized. It is used in the creation of alloys and in the manufacture of rechargeable batteries—both nickel-cadmium and lithium-ion—in everything from cell phones to large batteries for electric vehicles. These uses are responsible for a growing demand for cobalt.

Cobalt, in economically recoverable quantities, is usually mined as a by-product of copper and nickel mining. About 45% of the world's cobalt is from primary nickel deposits, 32% from copper deposits, and 21% from primary cobalt deposits. Currently 40% of the world's supply comes from cobalt-rich copper ore from the Congo (DRC) with 38% from Australia and South Pacific countries (Philippines, Indonesia, New Caledonia, and Papua New Guinea), 11% from other African countries, 5% from North America and 6% from other areas. Growing demand and the instability of DRC-sourced cobalt are increasing exploration efforts worldwide. Cobalt bearing minerals found in economic deposits include: erythrite, skutterudite, cobaltite, and carrollite.

Spectral Evolution's oreXpress spectrometers are designed for single-user operation in the field during exploration. They are rugged and reliable with fixed optics and no moving parts to avoid breakdowns. They capture high resolution spectra very quickly so that a geologist can scan more and collect more data for planning a drilling strategy that will maximize return on investment.

Using the oreXpress with EZ-ID with its three libraries, a geologist can quickly identify an alteration mineral that may not be readily identifiable by sight, matching an unknown sample against a known spectral library. With EZ-ID the geologist can select specific spectral regions to fine-tune the matching process for a more precise ID. If the geologist wants to look at a particular absorption feature, the geologist can highlight that or other features and EZ-ID provides new matches. EZ-ID includes a Library Builder module for the inclusion of project and location specific scans of known samples for comparison with target samples.

By ordering EZ-ID with the three libraries, a geologist has access to a wide range of match possibilities—more than 2600 spectra—for exploration projects. There are six known samples of erythrite in EZ-ID.

EZ-ID works right from the DARWin SP Data Acquisition software included with all SPECTRAL EVOLUTION spectrometers and spectroradiometers. All spectra collected with an oreXpress are saved as ASCII files for easy import into other 3rd party analysis software for mine planning, mineral mapping and 3D imaging.

In the core shack, the speed of the instruments is ideal for core logging. In some cases, a single geologist has been able to log as much 400 meters of core in a day. The data can be used to show mineralogy versus alteration type versus mineral assay.

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oreXpress spectrometers are used to better understand and map mineral alteration zones in the field during exploration.



EZ-ID software identifies minerals in real-time by matching your target spectra against three known spectral libraries. Above is a sample of one of six erythrite scans in the libraries showing absorption features at 405, 570, 666, 735, 873-1621, 1765, 1951, 2169, 2350 and 2461nm.

